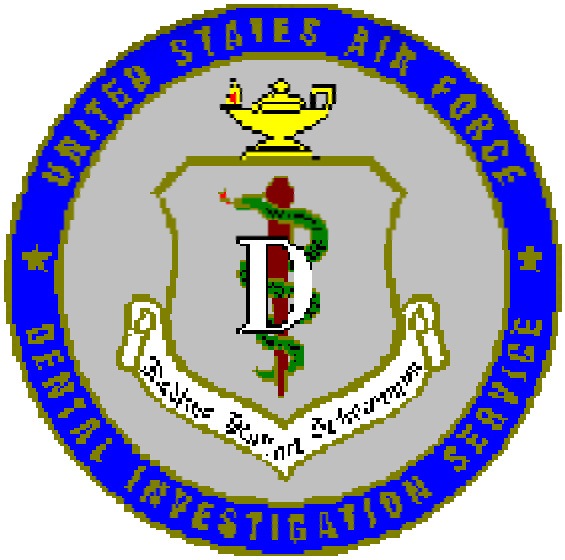
YEAR 2000 USAF DENTAL INFECTION CONTROL GUIDELINES



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CHAPTER 1

USAF DENTAL SERVICE INFECTION CONTROL PROGRAM

1.1. **INTRODUCTION**. The goal of the USAF Dental Service Infection Control Program is to protect the health of all patients and employees and to comply with applicable federal, state, and local regulations governing infection control, job safety, and management of regulated medical waste.

1.2. **RESPONSIBILITIES.**

1.2.1. The Consultant to the Surgeon General in Dental Infection Control and Occupational Health and Safety. The USAF Surgeon General appoints a Special Consultant for Dental Infection Control and Occupational Health and Safety. The duties of this special consultant include, but are not limited to, the following:

1.2.1.1. Advising HQ USAF/SGD on current issues relevant to dental infection control and occupational health and safety.

1.2.1.2. Acting as a liaison between other USAF consultants in related areas including dental specialties, medical treatment facility (MTF) infection control, infectious diseases and epidemiology, operating room nursing, Central Sterile Services (CSS), Bioenvironmental Engineering (BEE), and Public Health (PH).

1.2.1.3. Opening and maintaining lines of communication with federal regulatory and advisory agencies including the Occupational Safety and Health Administration (OSHA) and the Centers for Disease Control and Prevention (CDC) as well as with other recognized authorities in the fields of dental infection control and occupational safety and health.

1.2.1.4. Developing and publishing HQ USAF/SGD approved guidelines for the USAF Dental Infection Control Program. The consultant will update this guidance, as needed, based on changes in federal regulations, recommendations from advisory agencies, and current Air Force policy.

1.2.1.5. Assisting Air Force dental services in developing effective programs by disseminating information via periodic infection control updates and by direct and written communication.

1.2.2. The Dental Infection Control Officer. The dental squadron/flight commander assumes overall responsibility for oversight of dental service infection control and occupational health/safety programs within the base dental service. He or she will appoint a dental infection control officer (ICO) and/or dental noncommissioned officer (NCO) to assume these duties. Appropriate education and training are strongly encouraged prior to assuming these duties. Responsibilities should include, but are not limited to:

1.2.2.1. Developing and implementing the base dental service infection control program including measures to comply with current USAF policy, guidelines, and OSHA requirements for protection of dental healthcare workers (DHCWs) from exposure to bloodborne pathogens.

1.2.2.2. Representing the dental service on the MTF Infection Control Committee.

1.1.1.3. Ensuring initial, annual, and update training for dental personnel on dental infection control and occupational exposure to bloodborne pathogens in accordance with OSHA standards.

1.1.1.4. Conducting an ongoing surveillance program coordinated with guidance from the MTF. This program should include, but is not limited to, periodic spore testing, monitoring of the dental unit waterlines, reporting clinic-acquired infections to the MTF infection control committee, and periodic dental clinic inspections.

1.2.2.5. Developing and implementing programs for the management of regulated waste within the dental clinic in accordance with federal, state, and local regulations.

1.2.2.6. Maintaining a dental infection control program notebook that should contain, at a minimum, the following items:

1.2.2.6.1. AFI 44-108, Medical Infection Control Program.

1.2.2.6.2. 29 CFR Part 1910.1030 Subpart Z (Amended) - OSHA Occupational Exposure to Bloodborne Pathogens; Final Rule or successor.

1.2.2.6.3. Current USAF Dental Infection Control Program, policy letters, and dental infection control consultant's updates.

1.2.2.6.4. Installation and/or MTF regulations on infection control, occupational exposure to bloodborne pathogens, and management of regulated medical waste.

1.2.2.6.5. References, including current OSHA, CDC and American Dental Association (ADA) guidelines for infection control in dentistry. A list of recommended references will be prepared and updated as needed by the Special Consultant in Dental Infection Control and Occupational Health and Safety.

1.3. **RELATIONSHIP TO OTHER REGULATIONS AND GUIDELINES.** This document supersedes *Dental Items of Significance #37*, June 1992.

1.3.1. These guidelines are designed to comply with current federal regulations including those issued by OSHA and the Environmental Protection Agency (EPA). The most current federal, state, local (including host country), and Air Force Instructions (AFI) take precedence over these guidelines whenever they are more stringent. The references for this document include current regulations governing dental infection control and employee protection in dentistry.

1.3.2. Guidelines and recommendations issued by nonregulatory agencies including the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO), the CDC, and the ADA will be used as references in the development of dental service infection control and employee protection programs. Consult the list of references for additional recommendations and guidelines applicable to infection control and employee health programs.

1.4. **OCCUPATIONAL EXPOSURE TO BLOODBORNE PATHOGENS.** All USAF Dental Services must comply fully with 29 CFR Part 1910.1030, OSHA Occupational Exposure to Bloodborne Pathogens, Final Rule. These OSHA requirements are intended to protect DHCWs from occupational exposure to bloodborne pathogens including human immunodeficiency virus (HIV) and hepatitis B virus (HBV). OSHA pamphlet 3129, Controlling Occupational Exposure to Bloodborne Pathogens in Dentistry provides useful guidance for implementation of the standard in dental clinics.

1.4.1. OSHA has determined that medical/dental employees face a significant health risk as a result of occupational exposure to blood and "other potentially infectious materials" (OPIM) because they may contain bloodborne pathogens. This risk can be minimized or eliminated by using a combination of engineering and work practice controls, personal protective equipment (PPE), training, surveillance, hepatitis B vaccination, signs, labels and other provisions. Standard-Universal precautions form the basis for the employee protection program for dental service personnel (see Chapter 2, Standard-Universal Precautions).

1.4.2. OSHA requires all MTFs to have a written exposure control plan that identifies employees with actual/potential risk of occupational exposure, describes procedures for evaluating exposure incidents, and provides a schedule for implementing the provisions of the rule. This document must be accessible to employees, available to OSHA, and reviewed and updated at least annually. A copy of a generic exposure control plan for health care facilities is included (Attachment 1). Percutaneous injuries and other exposure incidents will be promptly reported, evaluated, and documented according to current CDC guidelines.

1.4.2.1. Dental services are not required to prepare a separate, comprehensive, exposure control plan if they are covered under an MTF or installation plan.

1.3.1.2. Dental service specific procedures for protection of employees from occupational exposure to bloodborne pathogens should be incorporated into dental infection control or occupational safety operating instructions when the dental service is covered by an installation or MTF plan.

1.3.2. The dental ICO/NCOIC will conduct an occupational exposure determination (IAW current OSHA guidelines) that includes the following:

1.3.2.1. A determination as to whether there is actual or potential exposure to blood or OPIM involved in duty performance.

1.4.3.2. Identification of all individuals who work in areas where there is reasonably anticipated exposure to blood or OPIM. The exposure determination must be conducted without regard to the use of PPE.

1.4.4. The dental ICO must develop a training program lAW current OSHA guidelines on controlling occupational exposure to bloodborne pathogens in dentistry.

1.4.4.1. Training sessions must be comprehensive in nature and provide the opportunity for interactive questions and answers.

1.4.4.2. Training must include communication of the nature of hazards to employees, methods to identify and control hazards (e.g., labeling of potential biohazards, HBV vaccination, PPE), an explanation of mechanisms for reporting exposure incidents, and information on post-exposure evaluation and follow up.

1.4.5. Training records documenting each training session must be maintained for three years by the dental service or MTF IAW with current OSHA and MTF guidelines. Training records must include:

1.4.5.1. The date of training.

1.4.5.2. A content outline.

1.4.5.3. The trainer's name and qualifications.

1.4.5.4. The names and job titles of all persons attending the training.

1.3.6. Responsibility for providing HBV vaccination, post-exposure evaluation and follow up, and management of regulated medical waste is accomplished by other functions within the MTF (e.g., PH, BEE). The dental ICO/NCOIC must ensure proper coordination with these departments.

CHAPTER 2

STANDARD-UNIVERSAL PRECAUTIONS

2.1. **INTRODUCTION.** Identifying potentially infectious patients by medical history, physical examination, or readily available laboratory tests is not always possible. Extended periods often exist between the time a person becomes infected with a microbial agent and the time when laboratory tests can detect the associated antigens or antibodies. Consequently, even if a patient tests negative, he or she may still be infectious. Dental personnel must assume that all blood/body fluids and contaminated instruments and materials are infectious and routinely use Universal Precautions to protect themselves and their patients.

2.2. **DISCUSSION.** The OSHA Bloodborne Pathogens Standard requires the use of Universal Precautions to protect the healthcare worker from exposure to bloodborne pathogens. The basic principle of Universal Precautions is the assumption that all patients are potentially infectious. Therefore, the risk of exposure to blood or OPIM posed by a procedure dictates the level of precautions, rather than the perceived infectivity of the patient. In 1996, the Hospital Infection Control Practices Advisory Committee (HICPAC) issued guidelines for transmission-based precautions in hospitals. In addition to precautions for bloodborne pathogens, airborne, droplet and contact isolation procedures were also included. Under this regime, procedures to protect healthcare workers from bloodborne pathogens are referred to as Standard Precautions. In the dental setting, the precaution regimes are identical to Universal Precautions and will now be referred to as Standard-Universal Precautions.

2.3. **PATIENT MANAGEMENT.** All USAF Dental Services will adopt the use of universal blood and body fluid precautions as recommended by the CDC and required by OSHA.

2.3.1. Since all patients are assumed to be infectious, access to care must not be delayed or denied to patients solely on the basis of known or suspected seropositivity for bloodborne pathogens. Requests for serologic examination of patients should be made on the basis of medical considerations and routine treatment should not ordinarily be deferred pending results of those tests.

2.3.2. The decision to defer treatment until the present illness has resolved for patients who present with symptomatic infectious diseases (e.g., influenza, streptococcal pharyngitis, recurrent herpes labialis) should be based on the provider's best clinical judgment.

2.3.3. Medical consultation is strongly encouraged, when treating immunocompromised patients or those individuals at risk for specific postoperative infections (e.g., transplant patients, symptomatic AIDS patients, patients requiring infective endocarditis prophylaxis) to prevent the development of clinic-acquired infections.

2.3.4. Upon diagnosis of a reportable communicable disease, Public Health (PH) should forward an AF Form 570, *Notification of Patient's Medical Status*, to the dental clinic. This form should be placed on the left side of the patient's dental record, and serves as a valuable communication tool between PH and the dental clinic.

2.4. **IMMUNIZATION.** Dental personnel, including civilian employees, volunteers, and dental laboratory personnel who perform tasks where there is actual/potential exposure to blood and OPIM must be offered the hepatitis B vaccination in accordance with current OSHA requirements, Air Force and local MTF policies.

2.5. **CLINICAL ATTIRE.** Clinical attire is the basic clothing ensemble worn for dental treatment. Selection of clinical attire (i.e., military uniform or scrub suits) is based upon facility preference. According to OSHA, general work clothes (clinical attire) not intended to function as protection against a hazard are not considered to be personal protective equipment (PPE). Clinical attire must be supplemented with PPE when exposure to blood or OPIM is reasonably anticipated. If clinical attire becomes contaminated during the course of clinical treatment, the employer should launder the item. Acceptable forms of clinical attire in USAF dental clinics include:

2.5.1. Military duty uniform options are the blue service uniform, battle dress uniform (BDU), or fatigue whites (if available locally) supplemented by a blue, green, or gold clinic smock for all patient contact. Clinic smocks are not required for administrative duties, (e.g., records, reception, or logistics).

2.5.1.1. Skirts and short-sleeve scrubs are not recommended for wear during procedures where exposure to blood or OPIM is anticipated unless skin is protected by PPE.

2.5.1.2. The duty uniform must be supplemented with long-sleeved PPE when effective isolation of the operative field (use of rubber dam) cannot be accomplished and exposure to blood or OPIM is anticipated.

2.5.2. Civilian clothing (for civilian employees and volunteers) consists of shirt, long pants, socks and shoes. Skirts should not be worn when exposure to blood or OPIM is reasonably anticipated. Civilian clothing must be supplemented by clinic smock (color to be designated by contractual agreement or local policy) for all patient contact. Civilian clothing must be supplemented with long-sleeved PPE when effective isolation of the operative field cannot be accomplished and exposure to blood or OPIM is anticipated.

2.5.3. Short-sleeved scrub shirts and pants may be worn as clinical attire. Scrubs should be worn only in designated areas within the MTF as per local policy.

2.5.3.1. If long-sleeved scrub tops are worn for procedures where significant exposure to blood or OPIM is reasonably anticipated, the entire ensemble is considered to be PPE, and must be changed daily or when visibly soiled, and must be laundered by the employer.

2.5.3.2. If scrub suits are adopted as clinical attire, military personnel must insure appropriate military uniform is available for the duty day.

2.5.3.3. Uncontaminated clinical attire, including scrub suits, may be worn in designated areas according to local policy.

2.6. **PERSONAL PROTECTIVE EQUIPMENT (PPE).** Since the concept of Universal Precautions assumes that all patients presenting for treatment are equally infectious, the decision to use specific items of personal protective equipment must be based on the degree to which dental personnel reasonably anticipate exposure to blood and OPIM during a given procedure. Use of PPE will be dictated by the exposure risk posed by the procedure, not by the known or suspected serologic status of the patient. Appropriate PPE will be provided that will prevent reasonably anticipated exposure to blood or OPIM in compliance with OSHA rules.

2.6.1. Minimum PPE requirements for all patient contact include, but are not limited to:

2.6.1.1. Gloves (latex or synthetic; examination or surgical). Wash hands and reglove before beginning treatment procedures on another patient. Washing and repeated use of a single pair of gloves is not permitted. Hand washing is the most important means for preventing cross-infection and must not be overlooked or neglected (see Chapter 8).

2.6.1.2. Clinic smock as previously described in this chapter.

2.6.1.3. Principles of Standard-Universal Precautions also apply to resuscitation efforts. Protective equipment such as mouthpieces, resuscitation bags, or other ventilation devices must be available.

2.6.1.4. Facemasks are recommended for all patient contact and are mandatory where procedures may generate spray and spatter.

2.6.1.4.1. Masks must be changed between patients, when visibly soiled, or when saturated with liquids.

2.6.1.4.2. Masks must never be worn outside patient treatment areas.

2.6.1.5. The wearing of protective eyewear with solid side shields is recommended for all patient contact and is mandatory (in combination with facemasks) for procedures where spray, droplets, and spatter may be generated. Eyewear should be cleaned with antiseptic soap between patients. Acceptable forms of eye protection include:

2.6.1.5.1. Safety glasses (plano or prescription) with solid side shields attached. Although eyewear meeting American National Standards Institute Standard Z87.1-1989 is not required in order to comply with the OSHA bloodborne pathogens rule, dental personnel may be exposed to risks from high-speed projectiles. Therefore, safety glasses or goggles meeting this standard are recommended.

2.6.1.5.2. Chin length face shields (worn with facemasks when exposure to contaminated spray and spatter is anticipated). Most dental face shields do not offer protection from high-velocity projectiles.

2.6.1.5.3. Safety goggles.

2.6.2. Rubber dam or other appropriate isolation procedures in combination with high-volume evacuation (HVE) are considered effective engineering controls that permit the use of short-sleeved clinic smocks.

2.6.3. Long-sleeved clothing covers or gowns must be worn when exposure to blood and OPIM in the form of droplet, spray and spatter are anticipated (headcovers should be considered). PPE does not have to be fluid impervious or fluid resistant to meet OSHA standards, but must prevent contamination of clinical attire or skin. The use of shoe covers should be considered when contamination of footwear is anticipated. Situations that meet these criteria include, but are not limited to:

2.6.3.1. Sonic or ultrasonic scaling.

2.6.3.2. Surgical procedures using rotary or ultrasonic instrumentation.

2.6.3.3. Surgical procedures where unusually heavy bleeding may be anticipated (e.g., exodontia, maxillofacial reconstructive surgery, trauma surgery).

2.6.3.4. Manual decontamination of dental instruments where spray and spatter may be generated. All PPE worn during instrument decontamination procedures should be removed prior to returning to patient treatment (see Chapter 6).

2.6.3.5. Operative and prosthodontic procedures using rotary instruments without effective isolation.

2.6.4. All PPE should be changed at least daily or when visibly soiled.

2.7. **STORAGE AND LAUNDERING OF CLINICAL ATTIRE AND PPE.**

2.7.1. Clinical attire, including scrub suits, that has not been exposed to spray and spatter-containing blood or OPIM is not considered to be contaminated laundry. Uncontaminated clinical attire may be stored in personal lockers.

2.7.2. Clinical attire and reusable PPE that are visibly soiled with blood or OPIM or have been exposed to contaminated spray and spatter (PPE is considered contaminated in such instances even if no visible evidence of contamination is evident) are considered contaminated laundry and must be laundered at the expense of the MTF.

2.7.2.1. Contaminated clinical attire or PPE will be removed prior to leaving the dental clinic. Turn in soiled linen at the end of the work period. Do not store contaminated clinical attire or PPE in personal clothing lockers.

2.7.2.2. Contaminated laundry must be placed in an appropriately marked container in accordance with MTF guidance.

2.7.2.3. If contaminated laundry is wet, bags or containers must prevent leakage or soak-through.

2.7.2.4. Laundry should not be sorted in the clinic after it has been placed in containers for shipment to the laundry facility. Gloves and other appropriate PPE will be worn when handling contaminated laundry.

2.7.3. Disposable PPE that is not heavily contaminated with blood or OPIM is not considered by OSHA to be regulated medical waste (see Definition of Terms). Disposal procedures may vary depending on local regulations.

CHAPTER 3

INFECTION CONTROL PROCEDURES IN THE DENTAL TREATMENT ROOM

3.1. **INTRODUCTION.** Preparation and clean up of the dental treatment room (DTR) is one of the most important components of the infection control program. Although environmental surfaces have not been implicated to date in the transfer of bloodborne pathogens, all patients and dental personnel deserve a treatment area that is as free as possible from the risks of cross infection.

3.2. **DISCUSSION.** This chapter will provide guidance on decontamination and disinfection of noncritical items and surfaces (see Definition of Terms) within the DTR. The use of impervious physical barriers to protect frequently touched surfaces is usually preferable to the manual cleaning and chemical disinfection of surfaces between patients. Both approaches are acceptable for use in USAF dental clinics as long as they are consistently applied. The principle advantages and disadvantages of physical barriers as opposed to routine chemical disinfection are summarized below:

3.2.1. Advantages:

3.2.1.1. Considerable reduction in time required to prepare DTR for the subsequent patient.

3.2.1.2. Enhanced longevity of equipment due to reduced contact with corrosive, caustic, or staining compounds.

3.2.1.3. Greater assurance of compliance.

3.2.1.4. Reduced consumption of cleaners and disinfectants.

3.2.1.5. Reduced personnel exposure to chemicals.

3.2.2. Disadvantages:

3.2.2.1. Increased cost of consumables.

3.2.2.2. Increased volume of solid waste. (Barriers are not considered regulated waste in most localities unless heavily contaminated with blood or OPIM).

3.3. **PREPARATION OF THE DTR.**

3.3.1. Equipment and environmental surfaces that are contacted by healthcare workers during patient treatment will be barrier protected or cleaned and chemically disinfected between patients. Plastic wrap, aluminum foil, or impervious backed paper may be used to protect surfaces against contamination by blood or OPIM and to cover areas that are difficult to disinfect, such as light handles, dental control heads, switches or x-ray tube heads. Remove and discard the coverings while gloved. After regloving, replace barriers before seating the next patient.

3.3.1.1. Clean and disinfect surfaces (using an approved cleaner/disinfectant) between patients only when the integrity of physical barriers has been compromised or when visibly soiled. Environmental surfaces that have been covered with barriers should be cleaned and disinfected at the end of each clinical day.

3.3.1.2. Barrier-protected surfaces including units, chairs and countertops as well as surfaces not contacted during patient treatment may be cleaned and disinfected as part of scheduled housekeeping procedures.

3.3.2. Adhere to unit dose guidelines when dispensing disposable items. Preferably, include these items in instrument packs.

3.3.3. Clean and heat sterilize (steam autoclave or chemical vapor sterilization) all handpieces, including slow-speed attachments and ultrasonic scaler tips, between patients (see Chapter 6).

3.3.3.1. Chemical disinfection of dental handpieces is not acceptable in USAF dental clinics.

3.3.3.2. Slow-speed handpiece motors which do not contact mucous membrane may be barrier protected.

Cleaning, lubrication, and heat sterilization according to manufacturer's instructions may be performed as part of routine maintenance procedures.

3.4. **CRITERIA FOR SELECTION AND USE OF SURFACE DISINFECTANTS.** The adoption of a concept of "universal sterilization," as described in Chapter 6, for all critical and most semicritical instruments and devices (see Definition of Terms) will eliminate the need for high-level disinfectants in the DTR. Non-critical items and environmental surfaces can be effectively cleaned and disinfected using intermediate-level hospital-grade disinfectant/cleaners.

3.4.1. Products selected as surface disinfectants must be EPA-registered, hospital-grade, intermediate-level (tuberculocidal activity) disinfectants and will be used according to label instructions.

3.4.2. Intermediate-level disinfectants are not to be used to disinfect critical or semicritical dental instruments or materials.

3.4.3. All disinfectants used in the DTR should be reviewed and approved by the MTF infection control committee. Check with dental product manufacturers for compatibility of cleaners and disinfectants with equipment surfaces.

3.4.4. The following procedures are recommended for routine cleaning and disinfection of noncritical equipment and environmental surfaces in the DTR. Always follow the manufacturer's instructions when using disinfectants.

3.4.4.1. Prior to beginning disinfection procedures, don rubber gloves, facemask, and eye protection to reduce the risk of exposure to chemical disinfectants.

3.4.4.2. Avoid the use of spray bottles that generate mists or aerosols. Dispensers that generate streams or droplets reduce risks to the eyes, skin, and respiratory system.

3.4.4.3. Gauze sponges should not be immersed in disinfectants since the cotton fibers may inactivate some compounds. For the same reason, items should not be wrapped in disinfectant-soaked gauze sponges. The use of chemical disinfectants on dental handpieces is not recommended by major handpiece manufacturers and may void the warranty if damage occurs.

3.4.4.4. Glutaraldehydes and glutaraldehyde-based compounds should not be used for surface disinfection due to their potential toxicity.

3.4.5. The following procedures are recommended for "site-specific" cleanup of spills involving blood or OPIM (if not handled by the housekeeping department).

3.4.5.1. Commercial spill kits are available, or a "spill kit" can be easily prepared from a used alginate canister. Place 150 mL of sodium hypochlorite in a dark brown or opaque bottle, two absorbent household sponges, and a pair of heavy rubber gloves in the alginate canister. Label the kit and place in any area where blood spills are most likely to occur (e.g., oral surgery suites).

3.4.5.2. If a spill of blood or OPIM occurs, don appropriate PPE, including rubber gloves, remove the sponges, and pour the sodium hypochlorite into the container. Fill the container with water to dilute the sodium hypochlorite to approximately 1:10 (one part sodium hypochlorite to nine parts water).

3.4.5.3. Use the first sponge to blot (do not wipe) the spill. Place the contaminated sponge in a leakproof bag or container and dispose of it as regulated waste. Pour sodium hypochlorite on the area of the spill and allow it to remain in contact with the surface for 10 minutes. Use the remaining sponge to complete the cleaning of the spill site.

3.4.5.4. Dispose of the remaining disinfectant by pouring it down the sanitary sewer. Place the sponge and gloves in the canister and dispose of them as non-regulated solid waste.

3.5. **REDUCTION OF BACTERIAL LEVELS IN DENTAL TREATMENT ROOMS.** Routine use of the rubber dam, high-volume evacuation, and pre-procedural mouthrinse is recommended to reduce bacterial levels.

3.6. **CLINICAL PROCEDURES.** The following procedures are additional components of aseptic clinical

technique. The ultimate goal is to break the chain of infection and eliminate the possible transmission of infectious disease between patients and between patients and staff.

3.6.1. Sterile and clean patient treatment materials may be stored in the same drawers or cabinets, as long as there is no possibility of similar nonsterile items being used inadvertently when sterility is required (e.g., sterile and nonsterile gauze sponges stored in the same drawer or cabinet).

3.6.1.1. Use sterile forceps to dispense supplies. All clinical setups should have at least two sets of forceps, one of which is to be used only for dispensing consumables from bulk storage containers. Hands must never be used for this purpose.

3.6.1.2. Careful planning should eliminate the need to enter drawers or cabinets during procedures. Removal of gloves and hand washing, or the use of impervious barriers or overgloves are required when cabinets or drawers must be entered during treatment.

3.6.2. Never recap a needle using a two-handed technique. Use a recapping device or the “scoop” technique. In this technique, the cap is scooped up from the tray with the needle tip using only one hand. Never allow uncovered needles to remain on the instrument tray. Dental services should consider the use of needleless systems for I.V. sedation and safety syringes for local anesthesia.

3.6.3. Only sterile solutions will be used for procedures that involve the intentional penetration, incision, excision, or ablation of oral or perioral tissues and that will expose previously uncontaminated bone or soft tissue. The type of irrigating solution used for surgical procedures will be documented in the treatment narrative on the SF 603a. For surgical irrigation, use of opened, aseptically-decanted irrigation solutions is acceptable for up to 24 hours. Solutions may be used for up to one week for nonsurgical purposes. Record the date initially opened on all sterile solution containers. Solutions used for non-surgical irrigation will meet standards of potable water. (See Chapter 10 for additional guidance on water quality.)

3.6.4. Before leaving the DTR, remove and discard gloves and mask worn during patient treatment.

3.6.5. Annotate dental records, view radiographs, and take photographs after removing gloves and washing the hands unless overgloves are worn.

3.6.6. Place biopsy specimens in sturdy, properly labeled, leak-proof containers. If the outside of the container becomes visibly contaminated while collecting specimens, clean and disinfect or place in a new container or impervious bag. Specimens placed in formalin are not considered bio-hazardous but do pose a potential chemical hazard and should be labeled and handled in accordance with OSHA hazardous materials rules.

3.7. **DTR PREPARATION BETWEEN PATIENTS.** The procedures required to prepare the DTR for subsequent patients can be divided into two phases : instrument decontamination and sterilization (if not performed as a separate, centralized function), and the cleaning and disinfection of non-critical items and environmental surfaces. To avoid recontamination of the DTR from contaminated instruments, all instrument decontamination procedures must be completed prior to cleaning and disinfecting the DTR. More detailed guidance on instrument decontamination and sterilization is contained in Chapter 6.

3.7.1. Manual instrument decontamination (hand scrubbing) should not be performed in sinks within DTR’s, unless no other alternative exists. When no alternative method is possible, manual scrubbing of instruments is permissible. Hand scrubbing procedures include: using utility gloves; using a clean long-handled brush and keeping instruments submerged in water while scrubbing to reduce spatter; and cleaning only one-to-two instruments at a time to avoid percutaneous injuries.

3.7.2. All instrument cleaning should be completed and the contaminated instruments should be removed from the immediate patient treatment area (or be placed in a rigid, leakproof container) prior to breakdown and decontamination of the DTR. The next patient should not be seated in the DTR until all decontamination procedures related to the previous patient have been completed.

3.7.3. Use of an automated instrument washer or ultrasonic cleaner is recommended for decontaminating dental instruments. These devices are safer and are more effective than manual cleaning. When possible, covered ultrasonic cleaners should be located outside of the DTR.

3.7.4. If instruments cannot be immediately decontaminated, they must be placed in a rigid, leakproof

container. The use of a holding solution or enzyme cleaner may facilitate subsequent cleaning prior to processing. OSHA prohibits removal of reusable sharps (e.g., most dental instruments) by hand. If the container is used to transport instruments to central sterile or substerile areas, it must be red in color or be affixed with a biohazard label.

3.7.5. Place all regulated waste (definitions of regulated medical waste vary by locality) in designated leakproof containers identified either by red or by a biohazard label. Although covered trashcans are not required, if uncovered, they should not be in view of patients.

3.7.6. Decant liquid infectious wastes into the sanitary sewer system through clinical sinks (preferably not hand washing sinks or unit cuspidors) unless prohibited by state or local rules.

3.7.7. All contaminated items that have the potential to cause penetrating injury are considered "sharps." This includes, but is not limited to, scalpel blades, needles, orthodontic wires, endodontic files, burs, and used anesthetic cartridges. Place used disposable sharps in puncture-resistant containers specifically designed for that purpose. The container must be red or the universal biohazard symbol must appear on it. The containers should be wall mounted in each DTR, out of reach of children. Do not bend, break, or otherwise manipulate needles by hand except to remove needles from non-disposable dental anesthetic syringes.

3.7.8. Clean and disinfect all unprotected surfaces touched during procedures or when visibly soiled.

3.7.9. Remove gloves and wash hands and other exposed skin surfaces with an antimicrobial soap (see Chapter 8).

3.7.10. In the event that an exposure incident (see Definition of Terms) occurs during patient treatment, instrument decontamination, or DTR preparation, dental personnel must receive immediate post-exposure evaluation (follow current CDC postexposure prophylaxis guidelines and MTF regulations).

3.8. **HOUSEKEEPING.**

3.8.1. After the final patient of the day has been dismissed, complete appropriate instrument decontamination and DTR preparation procedures as previously described.

3.8.2. Disinfect the high-volume evacuator and low-volume suction line using an evacuation system cleaner. Follow the manufacturer's instructions for dilution, quantity, and frequency.

3.8.3. Clean and disinfect countertops, dental unit, chair, light, and other frequently touched surfaces.

3.8.4. Routine cleaning of environmental surfaces, including floors and other surfaces not generally contacted by health care workers in the DTR, sterilization areas, and the dental laboratory should be accomplished according to a written schedule based upon location within the MTF, types of contaminants present, and tasks or procedures performed.

CHAPTER 4

DENTAL RADIOLOGY

4.1. **INTRODUCTION.** The infection control principles applied in dental radiology are based on the concept of Standard-Universal Precautions and are essentially identical to those in use in the DTR. This includes hand washing, the use of barriers, aseptic technique, and the selection of appropriate PPE.

4.2. **PERSONAL PROTECTIVE EQUIPMENT.** For most radiographic procedures, gloves and clinical attire are satisfactory barriers. Gloves may not be required for extra-oral radiographic procedures (panoramic or cephalometric) unless needed to avoid contacting contaminated barriers placed over positioning bite blocks. A mask is not required, but may be worn if desired.

4.3. **ASEPTIC RADIOGRAPHIC TECHNIQUE.**

4.3.1 As in the DTR, frequently touched surfaces in the x-ray room (including x-ray tube heads, switches, and controls) should be barrier protected. They will be cleaned and disinfected if they become contaminated. They are also cleaned as part of routine housekeeping activities.

4.3.2. Film holding devices must be disposable (single use) or heat sterilized between patients. Consult manufacturer's instructions for compatibility with various sterilization methods.

4.3.2.1. Non-critical components (parts that do not contact mucous membrane) may be barrier protected. If they become contaminated, non-critical components will be cleaned and disinfected with an intermediate-level surface disinfectant.

4.3.2.2. Radiographic positioners may be bulk sterilized and dispensed using an aseptic technique.

4.3.2.3. New disposable panoramic x-ray bite block covers will be used for each patient. When disposable covers are not available, bite blocks should be processed in the same manner as other positioning devices.

4.3.3. Aseptic techniques must be used for handling contaminated radiographs. Care must be taken to avoid contamination of x-ray processing equipment with blood or OPIM.

4.3.4. If daylight loaders are in use, special care must be taken to avoid contamination of light-protective sleeves and other components. This may be accomplished in several ways including:

4.3.4.1. Use of impervious film carriers (extraoral barriers) such as paper cups, rubber gloves, or headrest covers to place films inside daylight loaders.

4.3.4.2. Use of impervious protective film covers (intraoral barriers) which are aseptically removed prior to film processing.

CHAPTER 5

DENTAL LABORATORY

5.1. **INTRODUCTION**. Standard-Universal Precautions to prevent exposure to bloodborne pathogens govern the activities of dental laboratory personnel as they do all other members of the dental team. The most effective practical method for protection of dental laboratory personnel is the implementation of a strict laboratory barrier system. This system is essentially a series of physical cleaning procedures designed to rid a prosthesis or impression of organic debris and microorganisms through a step-wise process of mechanical and chemical cleaning and disinfection. The result is a product that can be safely handled by laboratory personnel with no requirement for PPE.

5.2. **DISCUSSION.** Dental laboratories will utilize one of two general methods to provide infection control. First, the laboratory can be maintained as an isolated area, which requires all prostheses, impressions, and other laboratory work to be disinfected before entering the laboratory (i.e., Clean Dental Laboratory). The second technique uses a receiving area to isolate, evaluate, and decontaminate all materials entering the laboratory (i.e., Standard Dental Laboratory). Both techniques are effective and the choice of operations is dependent on physical plant, laboratory location, and personnel distribution.

5.3. **CLEAN DENTAL LABORATORY.** There are no special precautions in the receiving area. All disinfection procedures are accomplished in the DTR or professional work area by the DHCW prior to delivery to the laboratory.

5.4. **STANDARD DENTAL LABORATORY.** A specific area in the laboratory should be designated as a receiving area. All items that may be contaminated with blood or OPIM as a result of patient contact must enter the laboratory via the receiving area. After cleaning and disinfection, materials are considered to have been disinfected, and the balance of work on the case can be handled without the use of gloves, masks and safety glasses. Appropriate protection from projectile and particulate hazards should be used in all circumstances where lathes and other rotary instruments are used. Once the barrier system is in place, it is necessary to observe certain precautions to assure that the barrier is not “broken.” Failure to maintain barrier integrity could result in unnecessary exposure of dental laboratory personnel to risks of infection.

5.4.1. The laboratory barrier system must be rigidly enforced. “Rush cases” must not be permitted to violate the integrity of the barrier system.

5.4.2. All dental personnel must use appropriate PPE (including gloves, eye protection, and facemasks) when working in the receiving area.

5.4.3. Requirements for the receiving area include:

5.4.3.1. Ideally, the receiving area should be physically separate from the rest of the dental laboratory (an engineering control).

5.4.3.1.1. If physical separation cannot be accomplished, work practice controls must be instituted to maintain separation of “dirty” and “clean” procedures.

5.4.3.1.2. In smaller laboratories, if it is not possible to establish a permanent receiving area, work on dirty and clean cases must be strictly separated. Benches and other work areas should be barrier protected when working on contaminated materials and must be completely decontaminated prior to resuming work on clean items.

5.4.3.1.3. All personnel will wash their hands as they enter and leave the receiving area when handling contaminated instruments.

5.4.3.1.4. No impression, prosthesis, case pan, or other potentially contaminated item should be allowed to leave the receiving area unless it has been cleaned and disinfected.

5.4.3.1.5. The bench top will be either barrier protected or wiped down with an approved intermediate-level disinfectant solution between each case.

5.4.3.1.6. Individuals working in this area must wear appropriate PPE based on the risk of reasonably anticipated exposure to blood or OPIM posed by the procedure(s) to be performed.

5.5. **POLISHING PROCEDURES.** Pumice used in the polishing unit should be mixed with clean water. Tincture of green soap or other such detergent/surfactant can be added to pumice if desired.

5.6. **TREATMENT OF IMPRESSIONS.** Occlusal records and wax bite rims undergoing initial clinical try-in should be handled in the same manner as impressions as far as the barrier system is concerned.

5.6.1. Initial cleaning/rinsing of the impression should be accomplished in the DTR. If necessary, a small amount of dental stone may be sprinkled into the impression before rinsing to aid in the cleaning process.

5.6.2. The impression will be thoroughly sprayed with an appropriate intermediate- or high-level immersion disinfectant (using a non-misting dispenser) and placed in a sealed bag (charged atmosphere). Alternatively, the impression can be dipped in an appropriate intermediate- or high level immersion disinfectant and placed in a sealed bag (charged atmosphere). Impression disinfection can be accomplished in the DTR or laboratory, depending upon facility constraints.

5.6.2.1. Mark the bag with the appropriate patient information and the time that the disinfection process started. The impression is rinsed and poured by laboratory personnel after the required contact time has elapsed.

5.6.2.2. Alternatively, the impression may be immersed in disinfectant for the recommended contact time. Solutions will be discarded after use.

5.6.3. Slurry water must be made from fresh-set stone that has never been poured against a potentially contaminated impression.

5.6.4. Reusable impression trays will be thoroughly cleaned and heat sterilized between patients.

5.7. **TREATMENT OF PROSTHESES ENTERING THE LABORATORY.** A combination of factors, including time considerations and the lack of heat stability of many items, makes heat sterilization of all prostheses entering the laboratory impractical. For most prostheses, cleaning and chemical disinfection will remain the principal mechanism of reducing contamination. The following general procedures are recommended:

5.7.1. Initially scrub all prosthetic devices with a brush and antimicrobial soap to remove gross debris and contamination.

5.7.1.1. This procedure should be performed in the receiving area, a professional work area, or the DTR.

5.7.1.2. Heat sterilize brushes or store them in a container filled with an approved disinfectant.

5.7.2. Place the prosthesis in a sealable plastic bag or beaker filled with ultrasonic cleaning solution or calculus remover and place in an ultrasonic cleaner for the required time as specified by the manufacturer. Place the cover on the ultrasonic cleaner to reduce the potential for spatter. Inspect the item for cleaning efficacy before disinfection.

5.7.2.1. If ultrasonic cleaning does not remove all surface deposits, the use of a shell blaster may be indicated.

5.7.2.2. Use aseptic techniques similar to those described for daylight loaders to avoid contamination of the shell blaster (see Chapter 4, Dental Radiology).

5.7.3. To accomplish sub-surface disinfection, place the appliance in a resealable plastic bag containing a 1:10 dilution of sodium hypochlorite or other intermediate- to high-level disinfectant (do not use glutaraldehyde or phenolic disinfectants). Place in an ultrasonic bath for ten minutes.

5.7.4. After disinfection, rinse the prosthesis under running tap water, dry, and accomplish required work.

5.8. **TREATMENT OF CASES LEAVING THE LABORATORY.**

5.8.1. All prostheses and other potentially contaminated materials sent to other facilities must be cleaned and disinfected before leaving the dental laboratory.

5.8.2. Casts, impressions, and prostheses will be placed in a disposable plastic bag prior to packing.

CHAPTER 6

DECONTAMINATION, STERILIZATION, AND STERILE STORAGE

6.1. **INTRODUCTION.** Dental instrument processing consists of three phases: decontamination, sterilization, and sterile storage. A variety of effective options for accomplishing these processes are available and several will be described. The Association for Advancement of Medical Instrumentation (AAMI) and the American National Standards Institute (ANSI) provide guidance for the design and operation of dental instrument processing centers in both ambulatory care and hospital settings (see References).

6.2. **UNIVERSAL STERILIZATION.** This concept governs the processing of reusable dental instruments in order to render them safe for handling and reuse. All critical and semicritical items to be reused in patient care must undergo heat sterilization unless they are not heat stable and no acceptable heat sterilizable or disposable alternative exists. In these cases, a chemical sterilant should be used. The dental item classification used below is adapted from the Spaulding system used by the CDC. Refer to the Definition of Terms for a more detailed definition.

6.2.1. Critical Items. All reusable critical dental items must be heat sterilized between patients unless a disposable alternative is used.

6.2.2. Semicritical Items. If a semicritical item cannot withstand heat sterilization, a disposable or heat sterilizable alternative should be sought.

6.2.3. All high-speed dental handpieces and slow-speed handpiece attachments, including prophy angles (unless disposable), are considered at least semicritical and must be cleaned, lubricated, and heat sterilized between patients according to instructions provided by the manufacturer.

6.2.4. Only semicritical items for which no practical sterilizable alternative can be found should be chemically disinfected. Agents used for disinfection of semicritical items must be FDA-cleared, high-level disinfectants; (e.g., glutaraldehydes, hydrogen peroxide, or chlorine dioxide) used according to manufacturer's instructions.

6.2.5. Ethylene oxide sterilization is acceptable for use on nonheat stable dental instruments (excluding dental handpieces or other devices with narrow bore lumens or lubricated parts) where this modality is available through the MTF Central Sterile Services (CSS). Ethylene oxide sterilization equipment should not be installed in dental clinics.

6.3. **INSTRUMENT PROCESSING STRATEGIES.** Central instrument decontamination and sterilization activities are safer and more cost-effective than accomplishing instrument processing in the DTR. Additionally, the elimination of large numbers of small capacity ultrasonic baths and tabletop sterilizers--in favor of larger capacity centralized equipment--will result in significant cost savings for initial acquisition, replacement, and repair.

6.3.1. If centralization of instrument processing activities cannot be accomplished due to space, equipment, or manpower limitations, consistent procedures must be performed throughout the dental service.

6.3.2. Construction of central instrument processing areas should be considered when planning for all new facilities and renovating existing clinics.

6.3.3. The Dental Investigation Service should be contacted for assistance in developing programs for central instrument processing.

6.4. **PRINCIPLES OF INSTRUMENT DECONTAMINATION.**

6.4.1. Decontamination is considered the most critical step in instrument processing since processes intended to kill microorganisms (e.g., disinfection and sterilization) may not be effective if organic soil has not been removed by cleaning.

6.4.2. If instruments cannot be immediately decontaminated, they will be placed in a rigid, leakproof receptacle containing a holding solution (such as an enzyme cleaner) to prevent hardening of bioburden until ready for processing. OSHA rules prohibit removal of reusable sharps (e.g., most dental instruments) by hand. If the container is used to transport instruments to central sterile or substerile areas, it must be red

in color or be affixed with a biohazard label.

6.4.3. The decontamination process should be physically separate from dental treatment areas and other instrument processing functions. If instrument processing must be performed in patient treatment areas, strict separation of patient treatment, instrument decontamination, wrapping, and sterilization must be observed.

6.4.3.1. When instrument decontamination must be performed in the DTR, covered table-top ultrasonic baths should be used.

6.4.3.2. All instrument decontamination procedures (except operation of covered ultrasonic baths) must be completed prior to seating of the next patient.

6.4.4. Automated ultrasonic cleaners, instrument washers, and washer sterilizers are safer and more effective than manual cleaning or the use of table-top ultrasonic baths. Automated ultrasonic cleaners, instrument washers, and washer sterilizers should be located in sub-sterile or central sterile areas rather than in patient treatment areas. Manufacturer's instructions must be followed when using these devices. These instructions should be posted or readily available in locations where ultrasonic cleaners/instrument washers are used.

6.4.5. The following guidance applies primarily to table-top ultrasonic baths.

6.4.5.1. Keep table-top ultrasonic cleaner tanks as full as possible with solutions specifically formulated for use in ultrasonic cleaners.

6.4.5.2. Chemical germicides or other potentially toxic solutions should never be used in ultrasonic cleaners unless they are placed in a sealed plastic bag or beaker (see section 5.7).

6.4.5.3. Never place items directly on the bottom of ultrasonic cleaners.

6.4.5.4. Change cleaning solutions at least daily or when visibly contaminated.

6.4.5.5. To avoid damage to instruments, limit ultrasonic cleaning times to five minutes unless the manufacturer specifies longer times. Longer cleaning times may be required for some nonmetallic instrument cassettes.

6.4.5.6 Test ultrasonic cleaners periodically according to manufacturer's recommendations or use the generic test method provided (see Attachment 2).

6.5. **INSTRUMENT WASHERS AND WASHER STERILIZERS.** Instrument washers and washer sterilizers provide a cycle of cleaning, rinsing, and disinfection at temperatures high enough to provided at least high-level disinfection. Rigid, reusable container systems (instrument cassettes or baskets) are usually used with these devices to decrease the potential for injury to dental personnel during instrument processing. (Cassette systems are also compatible with larger ultrasonic cleaners).

6.6. **STERILIZATION.** Following decontamination, reusable dental items must undergo terminal sterilization.

6.6.1. Manufacturer's instructions must be followed when using all sterilization equipment. Copies of operating procedures should be posted or readily available in all areas where sterilization is accomplished. The following methods of heat sterilization are acceptable in USAF dental clinics: (Note that bead or salt "sterilizers" are not acceptable as a method of terminal sterilization between patients. See Attachment 3 for a summary of acceptable sterilization modalities, operating parameters, and methods of biological spore monitoring.)

6.6.1.1. Steam autoclave, either gravity displacement or prevacuum type.

6.6.1.2. Unsaturated chemical vapor sterilizer (Chemiclave). The use of chemical vapor will require baseline and periodic formaldehyde monitoring by the BEEs. Used chemical vapor sterilizer solutions are characterized as a hazardous waste and should be appropriately re-cycled or disposed of.

6.6.1.3. Dry heat oven.

6.6.1.4. Forced air dry heat (convection) sterilizer.

6.6.2. The following general principles apply to all heat sterilization modalities.

6.6.2.1. Select a method of sterilization compatible with the items and the packing materials to be sterilized.

6.6.2.2. Open or disassemble hinged or other complex instruments to permit exposure to sterilizing agents.

6.6.2.3. Use sterilization wraps, adhesives, and containers intended for use with the method of sterilization. For information on products not listed, contact the Dental Investigation Service, or the device or container manufacturer.

6.6.2.4. Quality disposable instrument wraps should be used in place of muslin or other fabrics. If reusable fabric wraps are used, they must be laundered and inspected for tears or pinholes after each use.

6.6.2.5. Label all packs or rigid containers to include as a minimum : the sterilizer identification number, load number, the initials of the person who wrapped the pack, and the date of expiration when using date-related packaging. (If using event-related packaging, refer to event-related sterility maintenance in Section 6.10).

6.6.2.6. Arrange packs loosely in the sterilization chamber. Do not overload.

6.6.2.7. Follow the manufacturer's recommendation for cycle lengths and other operating parameters.

6.6.2.8. Assure that scheduled maintenance and calibration are performed on all decontamination and sterilization equipment according to the manufacturer's recommendations.

6.7. **STERILIZATION MONITORING.** Both process indicators and biological spore monitors are used as means of quality assurance. Device-appropriate methods of sterility assurance will be used that are consistent with those used elsewhere in the MTF. Use internal or external chemical process indicators with each pack processed and perform biological spore monitoring at least weekly or as directed by MTF policy. Indicators and biological tests must be specifically designed for the sterilization process (steam, dry heat, chemical vapor).

6.7.1. Process indicators are chemical monitors that are designed to demonstrate that minimum sterilizing conditions (heat and/or pressure) have been met. A chemical process indicator on or within a package does not guarantee the sterility of its contents.

6.7.1.1. Multi-parameter indicators (MPI), also known as process integrators, that measure temperature, steam, and exposure time provide a more reliable indication that sterilizing conditions have been met and allow sterilization personnel to accept or reject loads at the time of processing.

6.7.1.2. Autoclave, chemical vapor, and dry heat adhesive sterilization (indicator) tapes are acceptable for use only as external indicators, and may demonstrate only that the package has been exposed to heat.

6.7.1.3. Process indicators will be placed on and/or within each package and will be visible from outside to verify that items have been processed. Both internal and external indicators are necessary when opaque packaging material is used.

6.7.2. Biological spore monitors use live *Bacillus subtilis (*dry heat) *or Bacillus stearothermophilus* (steam or chemical vapor) spores to measure the process lethality of a given sterilization cycle. Biological spore monitoring must be performed at least weekly on all sterilizers in service including sterilizers considered ready to use but in a "back-up" mode. Sterilizers that are not being spore tested should be tagged "NOT IN SERVICE" and may not be used until they have provided three consecutive negative spore tests. If the sterilizer is used for multiple types of cycles (e.g., wrapped items, flash-sterilized items), then each sterilization mode should be tested.

6.7.2.1. A biological monitor must be run for each load that contains an implantable device.

6.7.2.2. The type of biological spore monitor (usually either dry strips or ampules) selected must be appropriate to the sterilization process being monitored. (See Attachment 3 for monitor/sterilizer compatibility). For products not listed, consult the Dental Investigation Service or the manufacturer.

6.7.2.3. Biological spore strips or ampules should be placed within an instrument pack and in a location within the sterilizer that is least accessible to the sterilizing agent. Since this location will vary according to the type of sterilizer (gravity or pre-vacuum), users should consult the manufacturer's instructions for placement recommendations.

6.7.3. Air removal tests. Pre-vacuum steam autoclaves require periodic testing for air removal (the Bowie-Dick test or equivalent). Air removal tests should be performed according to the same schedule as biological spore tests or as directed by MTF policy.

6.7.4. Sterilizer Documentation. All sterilizer testing (e.g., spore tests, air removal tests) results will be recorded in a dental sterilization log. If the sterilizer is equipped with a printer or other automated system, the printout may be maintained as a record of sterilizer performance. Results of spore testing will be reported to the MTF infection control committee in the format and on a schedule dictated by local policy. Records will be maintained for a period dictated by local statutes and MTF policy or 2 years, whichever is longer. Minimum documentation includes:

6.7.4.1. Date and time of test.

6.7.4.2. Sterilizer identification number.

6.7.4.3. Sterilizing conditions - temperature and exposure period (automated documentation, if available).

6.7.4.4. Person conducting test.

6.7.4.5. Results of control.

6.7.4.6. Results of test.

6.7.4.7. Nature and date of any malfunctions or repairs performed.

6.7.5. Positive Spore Tests. If any biological monitor reads positive:

6.7.5.1. Notify the dental ICO/NCOIC and secure the sterilizer to prevent further use.

6.7.5.2. Document the positive spore test in the dental sterilization log.

6.7.5.3. Recall instrument packs sterilized since the last negative spore test.

6.7.5.4. Notify medical equipment repair personnel.

6.7.5.5. Retest with biological spore monitors. Check for expiration dates on monitors and proper functioning of incubators.

6.7.5.6. Review the sterilization log for evidence of recent repairs, maintenance, or malfunction.

6.7.5.7. Return the sterilizer to service following repair technician evaluation and/or repairs and three consecutive negative spore tests.

6.8. **CENTRAL INSTRUMENT PROCESSING.**

6.8.1. Dedicated Work Areas. The design and outfitting of a sterilization area must include work areas for receiving, decontaminating, processing, sterilizing, storing, and issuing.

6.8.2. Functional Flow of the Sterilization Process. Do not process contaminated instruments, materials, or equipment in an area or on a surface common to the handling of sterilized items. Materials and equipment must pass from receipt to issue without physically retracing or impinging on a preceding or subsequent step or area.

6.8.3. Traffic Control. Controlled access to the pre-sterilization and sterilization areas minimizes the potential for transfer of microorganisms between contaminated items, patients, and staff. These areas must be off limits to anyone not involved in the sterilization process.

6.8.4. Receiving and Decontamination. Ideally, this area will be physically separate from the remainder of the sterilization area. If physical separation is not possible, proper outfitting and equipment selection is critical. When programming for replacement or upgrade of facilities, select equipment that minimizes handling of contaminated materials and instruments. At a minimum, the decontamination area must be equipped with ultrasonic cleaners of sufficient capacity to handle the anticipated workload.

6.8.5. Processing. Ample work surface for the volume of materials processed is critical. All inspecting, sorting, wrapping, and packaging of contaminated materials occur here. The height and overall dimensions of the work surface, plus a clear surrounding area, are important considerations when planning a functional processing area.

6.8.6. Sterilization. The space required for sterilization equipment, including sufficient access for loading, unloading, and servicing, dictates the size of this area.

6.9. **STERILE STORAGE**. All sterile supplies, including sterile reusable dental items, must be stored in a manner that will preserve their sterility until used. Factors affecting this process include:

6.9.1. Environmental Conditions. Cleanliness, proper ventilation, and control of excess heat and humidity are important.

6.9.2. Location. Sterile supplies should not be stored in a manner that may contribute to the increased possibility of contamination.

6.9.2.1. Sterile items should not be stored in patient treatment or decontamination areas unless protected by enclosures such as drawers or cabinets. Opening of protective enclosures should be discouraged while potentially contaminated droplets, spray, or spatter is actively being generated.

6.9.2.2. Sterile items must not be stored on the floor, under sinks, on windowsills, adjacent to heating and air conditioning vents, or in any area where undetected contamination might occur.

6.9.2.3. Sterile items should not be stored with items not intended for clinical use (e.g., office supplies, cleaning supplies).

6.9.2.4. Shipping cartons will not be used to dispense sterile or clean patient treatment items.

6.9.2.5. Semicritical or noncritical items such as orthodontic pliers, photographic mirrors, and x-ray positioning devices that have been sterilized unwrapped may be stored in new clean packaging until used. The date of sterilization must be recorded on the packaging. These items are not considered sterile and should never be used for invasive procedures.

6.10. **EVENT-RELATED STERILITY MAINTENANCE**

6.10.1. **INTRODUCTION.** Several studies have shown that the shelf life of a packaged sterile item is event-related and not time-related. Many organizations including the Association of Operating Nurses (AORN), the Association for the Advancement of Medical Instrumentation (AAMI), the Centers for Disease Control and Prevention (CDC), and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) have eliminated all references to expiration dating from recommended practices.

6.10.2. **DISCUSSION.** The practice of event-related shelf life recognizes that a product remains sterile until some event causes the item to be contaminated. This concept developed due to a greater understanding of factors affecting sterility including barrier efficiency of packaging material, storage conditions and handling practices, and events compromising sterility.

6.10.3. **RATIONALE.** Packages become contaminated with the passage of time only because the packages are exposed to events during storage. The shelf life of a packaged sterile item is event-related and depends on the quality of the wrapper material, the storage conditions, the conditions during transport, and the amount of handling.

6.10.4. **FACTORS.** There are multiple factors to determine shelf life including the type and configuration of packaging material, number of times a package is handled before use, number of personnel who may have handled the package, storage conditions (cleanliness, temperature, humidity), use of dust covers, and

methods of sealing.

6.10.4.1. The barrier efficiency of packaging material may be comprised by many factors including:

6.10.4.1.1. Airborne bacteria or dust forced into a package by incorrect or excessive handling, poor storage facilities, or improper techniques.

6.10.4.1.2. Moisture absorbed into the package.

6.10.4.1.3. Direct entry of microorganisms by holes, breaks, or ruptured seals.

6.10.4.1.4. Improper opening of the package.

6.10.5. **PACKAGING.** The FDA classifies sterilization wrap as a Class II medical device. The wrap must allow sterilization of the enclosed medical device, equipment, instrument(s), or supplies and must maintain sterility until used. Sterility maintenance is influenced by the quality of packaging material.

6.10.5.1. The material selected must maintain the sterility of the contents after sterilization.

6.10.5.2. Assembly and packaging must be conducted in such a way that the sterilization process is effective. The sterilant must be able to penetrate the packaging and contact the item to be sterilized.

6.10.5.3. The contents of the package, when opened, must be able to be used with minimum risk of possible contamination as well as maximum user convenience.

6.10.5.4. Consider the following factors when selecting packaging material.

6.10.5.4.1. Suitability for the sterilization method, reliability as a microbe barrier, durability, shelf life, efficiency of use, proven seal integrity, abrasion resistance, ease and safety of opening, flexibility, lack of memory and pin-holes, absence of toxins or nonfast dyes, cost, and availability.

6.10.5.4.2. Review technical documentation of barrier performance supplied by the manufacturer, review sterility maintenance studies conducted by independent laboratories, and review the manufacturer's recommendations for appropriate use.

6.10.6. **HANDLING.** Packages should be handled only when absolutely necessary. Inventory control should involve minimal handling of supplies. Packs should not be touched until cool. Hot packs act as wicks absorbing bacteria-laden moisture from hands. Packages should be handled carefully to avoid crushing, bending, compressing, or puncturing. Packages of sterile items should be inspected prior to use to verify barrier integrity and dryness. Packages of reusable sterile items that are dropped, compressed, torn, or wet must be considered contaminated, and must be reprocessed.

6.10.7. **STORAGE CONDITIONS.** The following represent appropriate storage conditions for sterile packs.

6.10.7.1. Sterile materials should be stored at least 20-25 cm (8-10 inches) from the floor, 45-50 cm (18-20 inches) from the ceiling, and 15-20 cm (6-8 inches) from the outside wall.

6.10.7.2. The temperature should be from 18-22 degrees C (65-72 degrees F), with relative humidity from 35%-50%.

6.10.7.3. The storage area must be clean, dry, and dust/lint free with limited access. Sterile items should be positioned to avoid crushing and moisture contamination.

6.10.7.4. Open shelving may be used but requires special attention to traffic control, area ventilation, and housekeeping.

6.10.7.5. Closed or covered cabinets are recommended for storage of seldom-used sterile supplies.

6.10.8. **TRANSPORT.** Sterile supplies should be transported in a covered or enclosed cart with a solid bottom shelf. Reusable cart covers should be cleaned after each use and should have a reclosable opening. Carts should be decontaminated and dried prior to use for transporting sterile supplies.

6.10.9. **GUIDELINES.** Each facility should evaluate operating conditions before establishing policies on shelf life. Each institution must establish their own storage times and conditions. Each facility should have a written policy for addressing shelf life of all stored sterile items based on their unique internal practices. This should be coordinated with the MTF Infection Control Committee. Successful implementation of event-related sterility maintenance depends on the barrier quality of the packaging material, internal storage conditions, conditions during transport, and handling practices. Consider the impact of event-related sterility maintenance including the savings in both reprocessing and labor costs.

6.10.10. **IMPLEMENTATION.**

6.10.10.1. Define the goals of the policy.

6.10.10.2. Review the technical documentation on barrier quality of packaging materials.

6.10.10.3. Review the current practice.

6.10.10.4. Develop a policy.

6.10.10.4.1. Define the labeling policy.

6.10.10.4.2. Define the events that would require reprocessing of packages.

6.10.10.4.3. Determine which items need to be dated.

6.10.10.4.4. Define the rotation policy.

6.10.10.4.5. Define how to monitor compliance.

6.10.10.4.6. Develop and implement a training program.

6.10.10.4.7. Monitor infection rates before and after implementation of the new policy.

6.10.11. **POLICY SAMPLE.**

6.10.11.1. Subject: To provide sterility assurance of patient treatment items.

6.10.11.2. Objective: To provide guidelines for the use of sterile items.

6.10.11.3. Policy statement: All sterile items will no longer have an expiration date. Loss of sterility is event-related. These items may be used as long as the integrity of the package is not compromised by becoming torn, wet, damaged, or suspected of being contaminated.

6.10.11.4. Procedure:

6.10.11.4.1. Place an indefinite shelf life label on each sterilized item.

6.10.11.4.2. Each label should be documented with at least the sterilizer used, load number, sterilization date, and operator's initials.

6.10.11.4.3. All items processed for sterilization will be properly wrapped/processed to provide an effective barrier to microbes.

6.10.11.4.4. The user must inspect all packages before the package is used.

6.10.11.4.5. Verify that the internal/external indicators have been exposed to sterilization.

6.10.11.4.6. If the package is compromised (torn, wet, broken seal), do not use. If the item is a single-use item, discard. If the item is reusable, reprocess.

6.10.11.4.7. Rotation of supplies is important to ensure previously processed items are used before the more recently processed ones.

6.10.11.4.8. Ensure proper storage of items to reduce package compromise.

6.10.11.4.9. Consider using plastic dust covers for infrequently used items.

6.10.11.4.10. When using a rigid container system, follow the manufacturer's recommendations/guidelines in determining shelf life.

CHAPTER 7

PROGRAM SURVEILLANCE

7.1. **INTRODUCTION**. A successful infection control and employee protection program must have valid means to measure its effectiveness. The following methods can be used for this purpose.

7.1.1. Clinic-acquired infection reporting.

7.1.2. Sterilization monitoring.

7.1.3. Scheduled and unscheduled inspections.

7.1.4. Waterline monitoring.

7.2. **CLINIC-ACQUIRED INFECTION REPORTING.** Surveillance for clinic-acquired infections is one method to assess the effectiveness of the dental infection control program. Clinic-acquired infections are defined as those infections that were not present or incubating at the time that the patient was treated in the clinic. This program is distinct from nosocomial infection reporting which monitors problems with patients admitted to the hospital.

7.2.1. Dental clinics in conjunction with their local MTF Infection Control Committee should establish criteria for definitions of clinic-acquired infections, and methods of surveillance and reporting.

7.2.2. Case definitions. Reporting infections requires a set of pre-established criteria that define a clinic-acquired infection.

7.2.3. Surveillance goals should include: providing objective assessment of dental clinic-acquired infection rates, reducing morbidity and cost, establishing baseline infection rates based on well defined case definition criteria, educating DHCWs concerning data relevant to their practices, evaluating control measures designed to reduce infection rates, complying with accreditation standards, defending malpractice claims through implementation of an active surveillance program, and providing data useful in clinical research.

7.2.4. Surveillance processes should include: developing case definitions for clinic-acquired infections by procedure, prospectively collecting data using established case definitions, analyzing surveillance findings to determine clinic-acquired infection rates for specific procedures, reporting surveillance data, and using the data for quality improvement. Surveillance data must be analyzed appropriately and used to monitor and improve infection control and healthcare outcomes

7.2.5. Classification of surgical procedures. Invasive procedures can be classified according to the classification of surgical wounds per CDC Guidelines.

7.2.5.1. Class I Clean Wounds. Uninfected operative wounds in which no inflammation is encountered and not involving the oral cavity (definition not applicable to dentistry).

7.2.5.2. Class II Clean-Contaminated Wounds. Operative wounds in which oral cavity (oropharynx) is entered under controlled conditions and without unusual contamination, provided no evidence of infection or major break in technique is encountered.

7.2.5.3. Class III Contaminated Wounds. Open, fresh, accidental wounds, operations with major breaks in sterile technique, and incisions in which acute, nonpurulent inflammation is encountered.

7.2.5.4. Class IV Dirty or Infected Wounds. Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection (i.e., organisms causing postoperative infection were present in operative field before procedure).

7.2.6. Clinic-acquired infection.

7.2.6.1. Localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxins not present or incubating at the time of the appointment.

7.2.6.2. An infection which develops within 45 days as a result of a clinic procedure, in a patient who was

not exhibiting signs or symptoms of the infection at the time of the procedure. This includes communicable or infectious diseases acquired by a patient as a direct result of known clinic exposure.

7.2.6.3. An infection that occurs within 45 days after the operative procedure (or within 1 year if an implant is in place), and appears to be related to the operative procedure. The infection may involve superficial incision site (epithelial/subcutaneous tissues), deep incision site (fascial/muscle layer/bone), or any part of the anatomy other than the incision opened or manipulated during the operative procedure. At least one of the following must be present:

1) Purulent discharge.
2) At least one of the following signs or symptoms of an infection: pain or tenderness, localized swelling, redness or heat, fever (> 38° C).
3) An abscess or other evidence of infection on direct exam, during re-operation, or by histopathologic or radiologic examination.
4) Diagnosis by a dentist or attending physician.

7.2.7. Situations that should not be considered clinic-acquired infections include: infections associated with a complication or extension of an infection already present at the time of the appointment, unless symptoms strongly suggest the acquisition of a new infection.

7.2.7.1. The following should not be reported: suture abscess, alveolar osteitis, postoperative periapical inflammation or flare-up of existing pulpal or periapical infection following endodontic treatment.

7.2.8. The following documentation should be included in the report: date of initial appointment, date of onset of infection, type of infection, related culture/sensitivity data (if applicable), antibiotic(s) administered, date infection was resolved.

7.2.9. A written report should be prepared by the ICO and forwarded to the MTF Infection Control Committee for follow-up.

7.3. **STERILIZER MONITORING.** A sterilizer-monitoring program must be implemented as previously described in Chapter 6.

7.4. **INSPECTIONS.** Dental infection control personnel should conduct and document routine scheduled and unscheduled inspections of dental treatment rooms, the dental laboratory, decontamination and sterilization areas, and locations where sterile items are stored.

7.5. **WATERLINE MONITORING.** (See section 10.7).

CHAPTER 8

HANDWASHING

8.1. **INTRODUCTION.** Handwashing in healthcare facilities is the most important aseptic procedure in the prevention of nosocomial or clinic-acquired infections. Contaminated hands of healthcare workers are a potential source for person-to-person transmission of infection. The primary purpose of handwashing is to decrease potential pathogens on the hands acquired by recent contact with infected or colonized patients, contaminated instruments, and/or environmental sources. Handwashing significantly reduces microbes on the hands and protects both patients and the dental staff.

8.2. **DISCUSSION.** The skin harbors two types of bacterial flora: resident flora (also termed "colonizing flora") and transient flora (also termed "contaminating flora" or "noncolonizing flora"). Resident flora is persistently isolated from the skin of most individuals. These microorganisms are considered permanent residents of the skin and are not easily removed by mechanical friction but can be reduced with handwashing. Resident flora plays a minor role in disease transmission. Transient flora can contaminate the hands through contact with environmental surfaces, instruments, and patients. These organisms do not colonize or survive for extended periods of time, but are a major source of disease transmission. Routine handwashing can significantly reduce or remove transient microflora on the hands. In dentistry, pathogens found in blood, saliva, and plaque can cause infection via entrance through cuts, abrasions, or lesions on the skin, or can be transferred to mucous membrane by the hands and then transported to the bloodstream.

8.3. **GUIDELINES.** Handwashing products include plain soap and agents with antimicrobial activity. The wearing of gloves does not replace handwashing, but is an adjunct providing consistent protection from bloodborne pathogens and is required by OSHA.

8.3.1. To control skin flora, hands must be washed before glove placement and immediately after glove removal. Glove use provides a warm, moist environment that can result in microbial overgrowth as high as 4,000-fold per hour, and can cause skin irritation. Handwashing before glove placement reduces skin microbes at the onset. After glove removal, handwashing reduces the buildup of microorganisms that have multiplied under the gloves and removes transient flora that may have entered through pinholes and tears.

8.3.2. Both mechanical friction and rinsing are important for effective handwashing. Plain soap (without antimicrobial activity) and water is effective in removing dirt and some microbes but does not inactivate any remaining pathogenic microorganisms.

8.3.3 Antimicrobial soaps destroy most transient flora and reduce resident microbes. Antimicrobial agents destroy or inhibit microorganisms and can reduce microflora counts further over time (residual effect) due to the ability to bind to the stratum corneum. Antimicrobial agent selection should be based on inherent characteristics, type and spectrum of activity, and the application for which it will be used.

8.3.4. Antimicrobial formulations called "healthcare personnel handwashes" have low-to-medium levels of broad-spectrum antimicrobial activity. These products are fast acting and designed for frequent use in 10-30 second routine handwashing regimens.

8.3.5. Surgical hand scrubs contain the highest level of antimicrobial agent, and are indicated when a more vigorous scrubbing procedure requiring maximum reduction of both transient and resident flora is needed. These agents are fast acting, persistent agents with broad-spectrum activity.

8.3.6. OSHA's Bloodborne Pathogens Standard requires that handwashing facilities be readily accessible to all employees. This standard has several other requirements.

8.3.6.1. Employees must wash their hands immediately (or as soon as is feasible) after removing gloves or personal protective equipment.

8.3.6.2. Employees must wash their hands and skin with soap and water immediately (or as soon as is feasible) after contact with blood or other potentially-infectious materials. Likewise, mucous membranes such as the eyes, nose, or mouth that have been in contact with blood, saliva, or other potentially-infectious materials should be flushed with water.

8.3.6.3. If handwashing facilities are not available, employers must supply antiseptic hand cleaner and towels.

8.4. **ANTIMICROBIAL AGENTS**

8.4.1. Alcohols denature proteins and possess excellent bactericidal activity against most vegetative gram-positive and gram-negative microorganisms. They also exhibit good activity against *Mycobacterium tuberculosis*, many fungi and viruses. In appropriate concentrations, they provide the most rapid and abundant reduction in microbial skin counts. Alcohols are poor cleaning agents and thus are not recommended in the presence of soils. Three types of alcohols are most appropriate on skin: ethyl (ethanol), normal-propyl (n-propyl), and isopropyl. Concentrations between 60% and 90% by weight are most effective. Disadvantages include a drying effect on skin and potential volatility/flammability.

8.4.2. Chlorhexidine gluconate (CHG) derives its antimicrobial activity by disruption of microbial cell membranes and precipitation of cell contents. CHG is most effective against gram-positive bacteria. CHG has relatively low skin irritation potential. The speed of antibacterial effect is classified as intermediate. CHG has substantivity, remaining chemically active for at least 6 hours. Its activity is pH-dependent (5.5 to 7.0). CHG is offered in many formulations, including 2% aqueous/foam and 4% liquid preparation.

8.4.3. Iodophors consist of iodine and a carrier such as povidone. The antimicrobial effects are the result of cell wall penetration, oxidation, and substitution of microbial contents with free iodine. Iodophors have a wide range of activity against gram-positive and gram-negative bacteria, tubercle bacillus, fungi, and viruses. Iodophors are rapidly neutralized in the presence of blood and have a propensity for causing skin irritation and damage. Formulations include 0.05%, 2%, 7.5%, and 10% solution.

8.4.4. Para-chloro-meta-xylenol (PMCX) acts by disrupting microbial cell walls and inactivating enzymes. It has good activity against gram-positive organisms, but only fair activity against gram-negative bacteria, tubercle bacillus, fungi, and viruses. Skin sensitization from PMCX is low and its speed of antibacterial effect is classified as intermediate. It is currently available in concentrations of from 0.5% to 3.75%.

8.4.5. Triclosan's antimicrobial activity is a result of its ability to disrupt the microbial cell wall. Triclosan shows good activity against gram-positive and gram-negative bacteria. Its speed is intermediate and it has excellent substantivity. Concentrations range from 0.3% to 2%.

8.5. **GENERAL HANDWASHING PRINCIPLES.**

8.5.1. Apply an antimicrobial agent and thoroughly distribute over all surfaces.

8.5.2. Vigorously rub hands together on all surfaces.

8.5.3. Duration is important because it promotes more effective mechanical action and sufficient contact time to achieve the desired effect.

8.5.4. Hands should be thoroughly rinsed to remove residual agent and dried completely.

8.5.5. If the sink does not have foot controls or automatic shutoff, a paper towel should be used to shut off the faucet to avoid recontaminating the hands.

8.5.6. All dental healthcare providers will wash their hands: at the beginning of each duty day; between patients; before and after going to lunch, taking a break, or using the bathroom; any time hands become contaminated; before gloving; immediately after degloving; and at the end of the duty day.

8.6. **HANDWASHING PROCEDURES.**

8.6.1. At Beginning of day

8.6.1.1. Remove jewelry and gently clean fingernails.

8.6.1.2. Scrub hands, nails, and forearms with a liquid antimicrobial handwashing agent and soft sterile brush or sponge for one minute and rinse with cool-to-lukewarm water for 10 seconds.

8.6.1.3. Vigorously lather hands and forearms with the germicidal agent for 20 seconds and rinse with cool-to-lukewarm water for 10 seconds.

8.6.1.4. Dry hands, then forearms, with clean paper towels and use the towels to turn off hand-controlled sink faucets.

8.6.2. Routine Handwashing during the Day.

8.6.2.1. Vigorously lather hands and forearms with a liquid antimicrobial handwashing agent for 20 seconds and rinse with cool-to-lukewarm water for 10 seconds.

8.6.2.2. Repeat lathering and rinsing.

8.6.2.3. Dry hands, then forearms, with clean paper towels and use towels to turn off hand-controlled sink faucets.

8.6.3. Before Surgery (outside the operating room environment).

8.6.3.1. Remove jewelry and gently clean fingernails.

8.6.3.2. Scrub nails, hands, and forearms with an antimicrobial surgical scrub product and a soft sterile brush or sponge for 2 minutes using multiple scrub and rinse cycles.

8.6.3.3. Rinse hands and forearms with cool-to-lukewarm water starting with the fingers and keeping your hands above the level of your elbows. Let the water drip from your elbows, not your hands.

8.6.3.4. Dry with sterile towels.

8.6.3.5. Put on sterile gloves by inserting hands into the gloves held around the wrists by an assistant wearing sterile gloves.

8.6.3.6. Check the gloves for defects and do not touch contaminated items or surfaces before patient care.

8.6.3.7. Handwashing protocols for cases performed in the operating room should follow MTF policy.

8.7. **HAND CARE AND PROTECTION.** Glove use as a protective barrier has increased considerably since the inception of Universal Precautions. Many studies have shown extreme variability in the quality of gloves. Some brands exhibit leakage causing microbial contamination of the hands and possible transmission of infection.

8.7.1. Hands will always be washed before donning gloves, after glove removal, and when contacting contaminated inanimate objects.

8.7.2. Disposable singe-use gloves will never be washed and reused.

8.7.3. Gloves will be changed between patients.

8.8. **NAILS AND NAIL POLISH.** The fingernails are a common area to trap blood. Studies suggest that this blood is not easily removed during handwashing and may remain present for days.

8.8.1. Nails will be kept short, clean, and healthy because the majority of hand flora is found under and around the fingernails. Long nails make glove placement more difficult, may result in glove perforation, and may scratch or gouge patients during treatment.

8.8.2. Clear polish is preferable because dark colors obscure the subungual space, reducing the likelihood of careful cleaning.

8.9 **JEWELRY.** Hand jewelry makes donning gloves more difficult, may cause gloves to tear more easily, and may increase total bacterial counts. Only plain, smooth metal bands (i.e., wedding bands) are permissible during patient treatment. All wrist jewelry will be removed prior to patient treatment to avoid possible inadvertent contact with the patient resulting in skin abrasions.

8.10. **LOTION.**

8.10.1. Lotion may be used to decrease dryness resulting from frequent handwashing, and to prevent

dermatitis from glove use.

8.10.2. Petroleum-based products can accelerate the aging of latex gloves resulting in breakdown.

8.10.3. Water-based products facilitate the transfer of chemicals and proteins (important if the wearer is sensitive to these agents) in all types of gloves, but have minimal effect on the breakdown of latex gloves.

8.11. **STORAGE.** Handwashing products (e.g., soap, antimicrobial agents) can become contaminated or support microbial growth.

8.11.1. Bar soap is not recommended for any dental patient treatment areas.

8.11.2. Liquid products should be stored in closed containers and dispensed from either disposable containers or containers that are washed and dried before refilling.

8.11.3. Foot-or elbow-operated dispensers are recommended to decrease the potential for contamination.

8.11.4. Lotions should be dispensed in small, individual-use containers or pump dispensers that are not opened or refilled to reduce contaminants and bacterial growth. No personally procured large community bottles are acceptable.

8.12. **COMPLICATIONS.** Handwashing can have detrimental effects on skin integrity, which may involve reactions to ingredients in handwashing agents. Healthcare workers with dermatitis are at increased risk, because inflamed skin contains higher numbers of microbes, and handwashing will not significantly decrease bacterial counts. Dermatitis may increase the risk of exposure to bloodborne pathogens during patient treatment as well. A variety of solutions include moisturizers, emollients, “no-wash” products, powder-free latex gloves, nonlatex gloves, glove liners, and barrier lotions. Unfortunately, none of these solutions have long-term studies to determine efficacy. DHCWs with open sores or weeping dermatitis must refrain from direct patient contact and handling of patient care equipment until the condition is resolved. All cases of hand dermatitis should be evaluated by dermatology for treatment and follow-up.

CHAPTER 9

LATEX SENSITIVITY

9.1. **INTRODUCTION.** The mandate for Universal Precautions by the Occupational Safety and Health Administration (OSHA) to protect healthcare workers from bloodborne pathogens has led to an increase in the production of natural rubber latex (NRL) gloves. NRL has proven to be an excellent barrier against bloodborne microbes. With increased exposure to NRL however, latex sensitivity reactions have dramatically increased in both patients and healthcare workers. The incidence of reported allergic and anaphylactic reactions due to repeated exposure to NRL has become a growing concern.

9.1.1. NRL is a milky white fluid produced by various plants and should not be confused with synthetic rubber (butyl or petroleum-based). Synthetic rubber is not hazardous to latex-sensitive personnel.

9.1.2. Reactions to NRL can range from a local rash to anaphylaxis with complete respiratory and cardiac decompensation.

9.1.3. Latex exposure can result from skin contact, mucous membrane contact, inhalation of glove powder, and intravenous exposure. Mucosal, inhalation and parenteral exposure can lead to an anaphylactic reaction, while cutaneous exposure usually results in a localized reaction.

9.1.4. Sensitized individuals can significantly reduce the possibility of developing an allergic reaction by avoiding exposure to latex.

9.1.5. A latex-safe environment should be provided for any patient with a known or suspected allergy to latex.

9.2. **LATEX REACTIONS.** There are three types of latex reactions: irritant contact dermatitis, Type IV hypersensitivity, and Type I hypersensitivity.

9.2.1. Irritant contact dermatitis (ICD) is the most common reaction to latex, affecting up to 50 percent of healthcare workers. ICD is not a true allergy, but may become a chronic problem in left untreated. This reaction is caused by contact with a substance that physically or chemically challenges the skin. Manifestations include reddened, dry, irritated, cracked areas on the skin, usually on the hands. Common factors contributing to ICD include the following.

9.2.1.1. Frequent handwashing with certain soaps/antimicrobial agents.

9.2.1.2. Failure to completely rinse and dry hands.

9.2.1.3. Irritation from powder in the gloves.

9.2.1.4. Excessive perspiration when wearing gloves.

9.2.1.5. Metals/jewelry.

9.2.1.6. Lotions.

9.2.1.7. Excessive scrubbing.

9.2.1.8. Solvents (dentin bonding agents, acrylic resins, glutaraldehydes).

9.2.1.9. Eugenol.

9.2.2. Type IV hypersensitivity, also called allergic contact dermatitis, is the most common NRL allergy. This reaction results from exposure to chemicals added during processing and manufacturing. Both latex and nonlatex (synthetic) gloves can cause Type IV hypersensitivity. Symptoms can include a red, itchy rash that may manifest as vesicles or blisters on the skin beginning 24-48 hours after contact. The condition can become chronic through repeated exposure.

9.2.3. Type I hypersensitivity, also called latex allergy, is the most serious latex reaction. It results from

exposure to latex proteins. The amount of exposure needed to cause this reaction is unknown. Reactions usually begin within minutes of exposure, but can occur hours later. Symptoms vary from mild to severe.

9.2.3.1. Mild symptoms include skin redness, hives, and itching.

9.2.3.2. Severe reactions may involve respiratory symptoms such as runny nose, sneezing, itchy eyes, scratchy throat, asthma and, in rare cases, shock. The most severe manifestation of a Type I hypersensitivity can occur through exposure to airborne allergens via the respiratory route. Latex proteins adhere to powder particles and become aerosolized during glove removal.

9.3. **LEVELS AND ROUTES OF EXPOSURE.** The amount of latex exposure needed to produce sensitization or an allergic reaction is unknown. Reduced exposure to latex proteins has been reported to be associated with a decrease in sensitization and symptoms. Healthcare workers and patients can be exposed to latex proteins through the use of powdered latex gloves. Latex proteins bind to the powder and are released during glove removal. Once aerosolized, they can be inhaled or contact mucous membrane. Wearing latex gloves during episodes of hand dermatitis may increase skin exposure and increase the risk of developing a latex allergy.

9.4. **RISK FACTORS.** The following risk factors can contribute to developing latex sensitivity:

9.4.1. History of contact dermatitis.

9.4.2. History of common allergies (e.g., hay fever, asthma, eczema).

9.4.3. History of allergies to common foods (e.g., bananas, avocado, kiwi, chestnuts).

9.4.4. Occupational exposure to latex products (e.g., healthcare workers).

9.4.5. Individuals with congenital anomalies of the spinal cord (e.g., spina bifida, meningomylocele).

9.4.6. Individuals with urologic abnormalities requiring ongoing catheterization.

9.4.7. Individuals with a history of rash, swelling, or itching after blowing up balloons, wearing rubber gloves, or using latex-containing products.

9.4.8. Individuals with unexplained anaphylaxis during surgery, childbirth, urinary catheterization, rectal or vaginal exam, barium enema, or dental exam.

9.4.9. Individuals with severe or worsening latex glove-induced eczema, urticaria, or work-related conjunctivitis, rhinitis, and/or asthma.

9.4.10. Individuals who have undergone multiple medical/surgical procedures.

9.5. **PREVENTION IN THE WORKPLACE.** Prevention begins with minimizing or reducing exposure to latex as much as possible.

9.5.1. Choose the right glove for the right task. Glove selection should be based on the task being performed.

9.5.1.1. NRL gloves offer excellent barrier protection against bloodborne pathogens. If choosing latex, select low-protein, powder-free latex gloves. This will significantly reduce exposure to latex allergens while providing an effective barrier. Acceptable synthetic (nonlatex) glove alternatives include nitrile, neoprene, vinyl, and thermoplastic elastomers.

9.5.1.2. Latex gloves should not be used routinely for activities with minimal risk of exposure to blood or body fluids. Synthetic (nonlatex) gloves should be used for activities that are not likely to involve contact with infectious materials.

9.5.1.3. Latex gloves do not provide adequate protection against chemical exposure via skin contact and adsorption. Proper glove selection for chemical exposure depends on chemical constituent/concentration, exposure time, and required dexterity. Review the manufacturers' recommendations for proper chemical glove selection.

9.5.2. Use appropriate work practices to reduce the risk of reactions to latex.

9.5.2.1. Do not use a petroleum-based lotion while wearing latex gloves. These products can degrade latex gloves which compromises barrier integrity.

9.5.2.2. After removing gloves, wash hands with an appropriate handwashing agent, and dry thoroughly.

9.5.3. Frequently clean areas that may be contaminated with latex-containing powder residue (e.g., countertops, floors, ventilation ducts).

9.5.4. Recognize symptoms of latex allergy (skin rash, hives, flushing, itching, nasal/eye/sinus symptoms, asthma, and shock). If latex allergy is suspected, avoid contact with latex gloves and other latex-containing products until evaluated by a physician.

9.6. **PREVENTION PROTOCOL FOR LATEX-ALLERGIC HEALTHCARE WORKERS.**

9.6.1. Latex sensitivity or allergy must be confirmed and documented by a physician (preferably an allergist or dermatologist) and noted in the medical and dental record.

9.6.2. Personnel known to be latex sensitive should use the following recommendations to reduce latex reactions in the workplace.

9.6.2.1. Avoid contact with latex gloves or latex-containing products, unless otherwise directed by a physician. Selection of an acceptable synthetic (nonlatex) glove alternative is highly recommended. Always use sterile gloves for surgical procedures.

9.6.2.2. Avoid areas where exposure to powdered latex gloves worn by other workers is possible.

9.6.2.3. All personnel will report suspected allergic reactions or hypersensitivity to latex to their supervisor immediately. An evaluation by the Primary Care Manager (PCM) or equivalent is indicated.

9.6.2.4. The supervisor will ensure that synthetic (nonlatex) gloves are available to sensitized personnel.

9.6.2.5. The PCM or equivalent will be responsible for providing latex-sensitive personnel with counseling/recommendations on latex allergy.

9.6.2.6. Personnel identified with a latex allergy are encouraged to wear a Medic Alert bracelet or necklace.

9.7. **SCREENING.** Dental healthcare providers must annotate AF Form 696 for documented latex-allergic patients. When conducting the medical history, providers should ask specific questions relating to latex sensitivity for all patients. The following questions should be considered, and if the patient answers “yes” to any of the questions, initiate a consult to the PCM/allergist/dermatologist, and prevent latex exposure.

9.7.1. Have you ever been told you have a latex allergy?

9.7.2. Do you have a history of familial skin rashes?

9.7.3. Have you ever experienced any nasal congestion, swelling, itching, sneezing, wheezing, hives or shortness of breath after any medical or dental exam where latex gloves were used?

9.7.4. Have you had any reactions after handling any rubber products such as Band-Aids, rubber balls, balloons, or condoms?

9.7.5. Do you have frequent exposure to latex in your work setting?

9.7.6. Are you allergic to bananas, avocados, kiwis, chestnuts, or other fruits?

9.7.7. Have you had multiple surgical procedures in the past?

9.8. **TREATING LATEX-ALLERGIC PATIENTS.** All dental clinics should establish a written protocol for treating latex-allergic patients. Synthetic (nonlatex) gloves, dental dam, and other materials will be available

to treat patients with known or suspected allergy to natural rubber latex.

9.8.1. Ensure facility has latex-free patient care resuscitation kit or cart.

9.8.2. Designate a specific DTR to treat latex-allergic patients, preferably closest to the entrance.

9.8.3. Identify all latex-containing products and then remove from the designated DTR before patient treatment.

9.8.4. Ensure designated DTR is properly cleaned by housekeeping prior to patient care.

9.8.5. Schedule the patient as the first appointment of the day (preferably the first day of the week).

9.8.6. Use an instrument pack that was prepared without contact with latex products. Clean and wrap for sterilization using synthetic (nonlatex) gloves.

9.8.7. Use synthetic (nonlatex) gloves for DTR set-up, and non-latex substitutes for patient treatment (gloves, prophy cup, rubber dam, orthodontic elastics, blood pressure cuff, tourniquet).

9.8.8. If delivering local anesthesia, consider using a single-use glass ampule of local anesthesia and injecting with a latex-free syringe.

9.9. **EDUCATION.** All dental staff members should receive latex sensitivity education during facility orientation, and annually thereafter, and it should be documented on AF Form 55.

CHAPTER 10

DENTAL WATER QUALITY

10.1. **INTRODUCTION.** Studies have demonstrated that dental unit waterlines (narrow-bore plastic tubing that carries water to the high-speed handpiece, air/water syringe and ultrasonic scaler) are colonized with a wide variety of microorganisms including bacteria, fungi, and protozoans. Microorganisms colonize and multiply on the interior surfaces of the waterlines resulting in the formation of biofilms. Although oral flora may enter and colonize dental water systems, the public water system is the primary source of the microorganisms found in waterline biofilms. The levels of bacteria in water from untreated dental units often exceed 100,000 colony-forming units per milliliter (cfu/mL) of water. In contrast, the numbers of non-coliform bacteria usually considered acceptable in drinking and recreational waters is only 500 cfu/mL. Although there are very few published case reports associating illness with dental water contaminant, the level of microbial contamination found in dental water systems is at best unsanitary. Moreover, studies have shown the presence of many clinically proven human pathogens including *Pseudomonas, Legionella,* and non-tuberculous *Mycobacterium* .

10.2. **DISCUSSION.** Current dental water systems can not deliver water of optimal microbiologic quality without some form of intervention by the user. The scientific literature supports the need for improvement in dental unit water quality. Improving the microbiologic quality of water used in dental treatment shows commitment to high-quality patient care. All USAF dental clinics should take prudent measures to provide quality water for dental treatment and to ensure a safe and healthy environment for their patients and employees.

10.3. **AMERICAN DENTAL ASSOCIATION (ADA) RECOMMENDATIONS.** The ADA Council on Scientific Affairs has recommended to the dental industry and research community, that they improve the design of dental equipment capable of delivering water to patients by the year 2000. The goal is no more than 200 colony forming units per milliliter (cfu/mL) of aerobic, mesophilic, heterotrophic bacteria in the unfiltered output of the dental unit delivered during nonsurgical dental procedures. This goal exceeds the standards for drinking water (500 cfu/mL) and is equivalent to existing quality assurance standards for dialysate fluid.

10.3.1. All USAF dental clinics should follow the CDC recommendation that only sterile solutions be used for surgical procedures that involve the cutting of bone.

10.3.2. The number of colony forming units in water used as a coolant or irrigant for non-surgical dental treatment should be as low as reasonably achievable. The ceiling limit for acceptable dental water quality is no more than 500 cfu/mL of heterotrophic plate count bacteria. Non-surgical procedures include most subgingival scaling or restorative procedures and for initial access into the dental pulp.

10.3.3. Corrective action should be initiated to improve dental water quality whenever bacterial counts exceed 200 cfu/mL of heterotrophic plate count bacteria (action limit). The decision to use sterile water during non-surgical dental procedures should be based on the invasiveness of the procedure, the patient's immunologic status and other potential risk factors for infection.

10.4. **WATER QUALITY IMPROVEMENT.** There are several options for improving dental unit water quality.

10.4.1. Flushing.

10.4.1.1. The Centers for Disease Control and Prevention (CDC) recommends daily flushing of all water-carrying lines for several minutes prior to beginning treatment, and flushing for 20-30 seconds between patients to eliminate any retracted oral fluids.

10.4.1.2. Mechanical flushing is an interim measure and has no effect on biofilms. Studies show it does not consistently reduce the numbers of microbes without chemical treatment or filtration. Flushing between patients will remove patient material potentially retracted during treatment, and should be continued even when other methods to control biofilms are employed.

10.4.2. Daily draining and air-purging regimen.

10.4.2.1. All waterlines should be completely drained and air purged at the end of each day. This procedure will remove all existing water, dry the lines, and discourage the re-growth of microorganisms.

10.4.3. Independent water reservoir.

10.4.3.1. A independent water reservoir will eliminate the inflow of municipal water into the dental unit. It provides better control over the quality of source water for patient care, and helps avoid interruptions in dental care when local health authorities issue a “boil water” notice. Independent water reservoirs are available as optional equipment on most new dental units, and can be retrofitted to existing equipment. Contact the dental unit manufacturer or DIS for guidance before purchasing non-factory installed devices. Use of independent reservoirs without use of a germicidal treatment will have no effect on waterline biofilms. Follow the unit manufacturer’s recommended maintenance regimens to control biofilm formation. Dental personnel must handle the water reservoir with care to avoid cross-contamination. Water sources include sterile water, freshly distilled water, or tap water (brought to the point of boiling, or chlorinated one-drop to 750 mL). Distillers and containers of distilled water must be cleaned/disinfected regularly to prevent bacterial growth.

10.4.3.2. If using an independent water reservoir during surgical procedures, ensure the device can deliver sterile water.

10.4.3.3. Before purchasing an independent water reservoir, verify the product has been cleared by the Food and Drug Administration (FDA) for such use.

10.4.4. Chemical treatment regimen.

10.4.4.1. Contact the dental unit manufacturer before initiating chemical treatment to verify compatibility.

10.4.5. Point-of-use filters.

10.4.5.1. Filters can reduce the number of microbes in output water but have no effect on biofilms.

10.5. **Reducing Microbial Levels in Dental Waterlines.** The daily flushing of waterlines and the installation of anti-retraction valves will reduce, but cannot eliminate, microbial levels in the dental unit water supply. If separate water reservoirs or filters are not installed, the following procedures must be used until a water treatment protocol is instituted:

10.5.1. Flush waterlines for 2-3 minutes at the beginning of the duty day. (Less time may be required if units are equipped with an automatic flush system).

10.5.2. Flush waterlines for 20-30 seconds between patients. Handpieces and air/water syringe tips will be sterilized between patients. (Disposable syringe tips are an acceptable alternative). This procedure is appropriate with or without the use of separate water reservoirs.

10.5.3. Flush waterlines for 3 minutes at the end of the clinical day.

10.6. **INDEPENDENT WATER RESERVOIRS.** Independent water reservoirs, either ordered with new equipment or retrofitted, can virtually eliminate bacterial and fungal contamination when used with a routine disinfection protocol. Several studies have shown that any waterline treatment product/protocol can be potentially harmful to dental equipment if used inappropriately. Follow the instructions provided by the manufacturer. See Attachment 4 for dental waterline treatment protocol if the manufacturer of the dental unit does not provide guidance.

10.7. **MONITORING.** Periodic monitoring methods should be performed to assess compliance with recommended protocols and identify technique errors or noncompliance. There is no need to identify specific organisms unless investigating a waterborne illness or a unit refractory to treatment. Testing should accurately detect a wide concentration range and type of aerobic, mesophilic, heterotrophic, waterborne bacteria within a reasonable incubation time at room temperature. There are two options.

10.7.1. Water samples can be submitted to the microbiology lab or the BEEs and cultured using method 9215 (heterotrophic plate count) as described in Standard Methods for the Evaluation of Water and Wastewater, 20th Edition, American Public Health Association, American Waterworks Association, 1998.

10.7.2. Use of an in-office self-contained system that is equivalent to method 9215.

10.8. **RETRACTION.** Retraction is defined as reverse-flow of fluid inside the dental water tubing from the point of exit when the water is shut off. The retracted fluid may include patient material. Most current dental units are designed to prevent retraction of oral fluids. In most situations, this precludes the need for add-on "check" or "anti-retraction" valves unless indicated by the manufacturer. Older units may require these devices. Because the performance of "check" or "anti-retraction" valves may degrade over time, they should periodically be inspected and maintained as needed. Contact the manufacturer to determine the need for such a device and appropriate maintenance routine.

10.9. **EDUCATION.** All dental providers should be educated regarding microbial contamination and biofilm formation in dental unit waterlines. Education should stress the need for improvement in the quality of water delivered during patient treatment.

10.10. **CONCLUSION.** All dental facilities need reliable and economical methods to control or prevent biofilms in dental unit waterlines with minimal user intervention. The effluent water produced must be compatible with all dental restorative materials, and be free of potentially toxic or carcinogenic chemicals. Materials and designs of dental water systems vary greatly. At this time no universal treatment protocol can be recommended. A combination of approaches may offer the best available assurance of high-quality dental treatment water. Independent water reservoir systems, when used with a periodic chemical treatment protocol, have demonstrated safety and efficacy.

DEFINITION OF TERMS

Asepsis. The process of preventing the access of microorganisms.

Automated Washer Processor. Washer sterilizer, washer decontaminator, dishwasher, or other mechanical washing device.

Barrier Technique. The use of rubber, plastic, paper, foil, or other fluid-resistant materials to cover surfaces/items and protect them from contamination.

Bioburden. The number and type of viable microorganisms contaminating an object. Also known as bioload or microbial load.

Bioenvironmental Engineering (BEE). Biomedical Service Corps function responsible for identifying and controlling occupational hazards in the workplace.

Biological Control. An unprocessed biological monitor from the same lot as the test monitor. When cultured, serves as a control by verifying the viability of the unexposed organisms.

Biological Monitor. A bacterial endospore test designed to assess whether sterilization has actually occurred. Also known as biological spore test.

Blood. Human blood, human blood components, and products made from human blood.

Bloodborne Pathogens. Pathogenic microorganisms that are present in human blood and capable of causing disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Bowie-Dick Test. A diagnostic test of a prevacuum sterilizer's ability to remove air from the chamber and prevent air entrapment. This is not a sterility assurance test.

Chemical Disinfection. The destruction or inhibition of most viruses and bacteria while in their active growth phase. The process does not necessarily kill all spores nor can it be verified by a monitor.

Chemical Indicator. (See Process Indicator)

Clinical Attire. Work clothes worn when treating dental patients. Clinical attire may include duty uniform, whites, or scrub suits. Must be supplemented with personal protective equipment (PPE) such as clinic smocks or long-sleeved gowns when exposure to blood or other potentially-infectious materials (OPIM) is reasonably anticipated. Clinical attire must be laundered by the employer if it becomes contaminated with blood or OPIM.

Contaminated. The presence or reasonably anticipated presence of blood or OPIM on an item or surface.

Contaminated Laundry. Laundry that has been contaminated or can reasonably be anticipated to have been contaminated with blood or OPIM.

Contaminated Sharps. Any contaminated object that can penetrate skin including, but not limited to, needles, scalpels, glass (including used anesthetic carpules), orthodontic wires, endodontic files, and dental burs.

Critical Items. Instruments and materials that penetrate the skin, mucous membranes, or bone. These items must be sterile before use. Examples include surgical instruments, periodontal knives, and suture needles. (Some single-use disposable items, including wooden wedges, dental floss, matrix bands, retraction cord and rubber dam, may penetrate the crevicular space. Although technically critical, these items do not require sterilization if they are handled aseptically and not reused. All reusable items that may enter the gingival sulcus, including rubber dam clamps, must be heat sterilized between patients.)

Culture. The propagation and growth of microorganisms or living tissue cells in or on a nutrient medium.

Decontamination. The use of physical or chemical means to remove, inactivate, or destroy pathogens on a surface or item to the point where the surface or item is rendered safe for handling, use, or disposal.

Dental Item Classification. Dental items are classified as critical, semicritical, or noncritical based on the pathways through which cross-contamination may occur and the location and technique of instrument use. (CDC, Adapted from Spaulding Classification)

Engineering Control. Control (e.g., sharps disposal container, rubber dam) that isolates or removes the bloodborne pathogens hazard from the workplace. (OSHA)

Exposure Incident. Specific eye, mouth, other mucous membrane, nonintact skin, or parenteral contact with blood or other infectious materials that results from the performance of an employee's duties. (OSHA)

Exposure Time. The total continuous elapsed time during which the sterilizer is operating at preselected sterilizing parameters, such as temperature and pressure.

Fomite. An inanimate object or surface that acts as a reservoir or vehicle for the spread of infectious microorganisms.

Hand Washing Facility. A facility providing an adequate supply of potable running water, soap, and single use towels or hot air drying machines. (OSHA)

HBV. Hepatitis B virus.

HIV. Human immunodeficiency virus.

Infectious Microorganisms. Organisms capable of producing disease in appropriate hosts.

Infectious Waste. (See Regulated Waste).

Invasive Procedure. A surgical entry into the tissues, cavities, organs, or repair of traumatic injuries. This includes the manipulation, cutting, or removal or any oral or perioral tissue during which bleeding occurs or the potential for bleeding exists. Most routine restorative or related dental procedures are not considered invasive procedures.

Microorganisms. Bacteria, fungi, viruses, and bacterial spores.

Noncritical Items. Instruments, equipment, or materials that do not normally penetrate or contact mucous membrane, but which are exposed to spatter, spray, or splashing with blood or OPIM and may be touched by contaminated hands. These items require cleaning and intermediate-level disinfection. Examples include the dental unit, chair, and environmental surfaces within the DTR.

Nosocomial Infection. An infection originating in the environment of a hospital that was not present or incubating at the time of patient admission. (CDC)

Occupational Exposure. Reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties. (OSHA)

Other Potentially Infectious Materials (OPIM). Human body fluids (including saliva in dental procedures), any body fluid visibly contaminated with blood, and any unfixed tissue or organ (other than intact skin) from a human (living or dead). (OSHA)

Parenteral. Penetration of mucous membrane or skin as a result of events such as needlesticks, human bites, cuts, and abrasions. (OSHA)

Personal Protective Equipment (PPE). Specialized clothing or equipment worn by an employee to protect against a hazard. General work clothes (e.g., duty uniforms, pants, skirts or blouses) not intended to function as protection against a hazard are not considered PPE. (OSHA)

Public Health (PH). Biomedical Services Corps function with responsibility for public health programs in the workplace including HBV vaccination and post-exposure evaluation and follow up.

Process Indicator. Chemical dyes usually impregnated into paper strips or sterilizer tape. Used to

determine whether the conditions required for sterilization are met. Conversion of process indicators does not guarantee sterility. Also known as chemical indicator, chemical monitor, or dosage indicator.

Regulated (Medical) Waste. Liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially-infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially-infectious materials. (OSHA)

Sanitary Sewer System. A sewer system connected to a sewage treatment plant.

Saturated Steam Sterilization. A process which uses steam heat under pressure for sufficient length of time to kill all forms of microorganisms.

Semicritical Items. Instruments, equipment, or materials that frequently contact but do not usually penetrate mucous membranes. At a minimum, these items require high-level disinfection. Examples include radiographic positioning devices, mouth mirrors, photographic aids, and impression trays. Heat sterilization of semicritical items is preferable to high-level disinfection unless there is no heat stable or single-use disposable alternative.

Standard-Universal Precautions. Precautions universally applied to all patients, regardless of infectious status, to reduce the risk of bloodborne pathogen transmission.

Steam Generator. A device or component which produces steam for use in steam sterilizers. May be separate or built-in to the sterilizer.

Sterile/Sterility. Free from all living microorganisms.

Sterilization. Process that destroys all types and forms of microorganisms. Acceptable methods in USAF dental services include saturated steam sterilization, chemical vapor sterilization, and dry heat sterilization.

Sterilization Area. The area of a healthcare facility designed for housing sterilization equipment and conducting sterilization procedures.

The following types of sterilizers are most commonly used in dental practice:

a. Dry Heat Oven. A sterilizer that relies on static dry heat at 160 degrees C for 2 hours to 170 degrees C for 1 hour.

b. Forced Air Dry Heat (Convection Type). A sterilizer that relies on forced air at 190 degrees C. Sterilization cycles for unwrapped instruments may be as short as six minutes.

c. Steam Sterilizer (Autoclave) - Gravity or downward displacement type. A type of sterilizer in which incoming steam displaces the residual air through a port or drain usually in or near the bottom of the sterilizer chamber. Typical operating temperatures are 121-123 degrees C and 132-135 degrees C.

d. Steam Sterilizer (Autoclave) - Prevacuum Type. A type of sterilizer that relies on one or more pressure and vacuum excursions at the beginning or end of the cycle. This method of operation results in shorter cycle times due to the rapid removal of air from the chamber and the load by a vacuum system. Operating temperatures are 132-135 degrees C.

e. Steam Sterilizer (Autoclave) - Tabletop Type. A small-capacity steam autoclave that usually does not use externally generated steam. Heating elements either inside or outside the chamber are used to heat a measured amount of water, which is converted to steam under pressure.

f. Sterilizer (Chemiclave) - Unsaturated Chemical Vapor Type. A type of sterilizer which relies on heat, pressure and alcohol/formaldehyde-based proprietary solutions to achieve sterilization. Standard operating temperature is 131 degrees C.

Unit Dose. The quantity of materials or supplies required to treat a single patient.

Universal Precautions. A protocol for infection control that treats all human blood and body fluids as if known to be infectious for HIV, HBV, and other bloodborne pathogens. (CDC)

Work Practice Controls. Controls that reduce the likelihood of exposure by altering the way one performs a task (e.g., two-handed recapping of needles). (OSHA)

PERTINENT REGULATIONS AND REFERENCES

REGULATIONS

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ATTACHMENT 1

SAMPLE OF BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

Note: This sample plan is provided only as a guide to assist in complying with 29 CFR 1910.1030. (OSHA's Bloodborne Pathogens Standard). It is not intended to supersede the requirements detailed in the standard. Employers should review the standard for particular requirements that are applicable to their specific situation. It should be noted that this sample plan does not include provisions for HIV/HBV laboratories and research facilities, which are addressed in section (e) of the standard. Employers operating these laboratories need to include provisions as required by the standard. Employers will need to add information relevant to their particular facility in order to develop an effective, comprehensive exposure control plan. Employers should note that the exposure control plan should be reviewed at least on an annual basis and updated when necessary.

BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

Facility Name: [name of facility]

Date of Preparation: [date]

In accordance with the OSHA Bloodborne Pathogens Standard, 29 CFR 1910.1030, the following exposure control plan has been developed:

Exposure Determination

OSHA requires employers to perform an exposure determination concerning which employees may incur occupational exposure to blood or other potentially-infectious materials. The exposure determination is made without regard to the use of personal protective equipment (i.e., employees are considered to be exposed even if they wear personal protective equipment). This exposure determination is required to list all job classifications in which all employees may be expected to incur such occupational exposure, regardless of frequency. At this facility the following job classifications are in this category: [job classifications are listed here]

In addition, OSHA requires a listing of job classifications in which some employees may have occupational exposure. Since not all the employees in these categories would be expected to incur exposure to blood or other potentially-infectious materials, tasks or procedures that would cause these employees to have occupational exposure are also required to be listed in order to clearly understand which employees in these categories are considered to have occupational exposure. The job classifications and associated tasks for these categories are as follows:

Job Classification Tasks/Procedures: [tasks, procedures, are listed here]

Implementation Schedule and Methodology

OSHA also requires that this plan include a schedule and method of implementation for the various requirements of the standard. The following complies with this requirement:

Compliance Methods

Standard-Universal Precautions will be observed at this facility in order to prevent contact with blood or other potentially-infectious materials. All blood or other potentially-infectious material will be considered infectious regardless of the perceived status of the source individual.

Engineering and work practice controls will be utilized to eliminate or minimize exposure to employees at this facility. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be utilized. At this facility the following engineering controls will be utilized:
[list controls, such as sharps containers, etc.]

The above controls will be examined and maintained on a regular schedule. The schedule for reviewing the effectiveness of the controls is as follows: [List schedule such as daily, once/week, etc., as well as list who has the responsibility to review the effectiveness of the individual controls (e.g., the supervisor for each department, etc.)]

Handwashing facilities are also available to the employees who incur exposure to blood or other potentially-infectious materials. OSHA requires that these facilities be readily accessible after incurring exposure. At this facility handwashing facilities are located: [list locations, such as patient rooms, procedure area, etc. If handwashing facilities are not feasible, the employer is required to provide either an antiseptic cleanser in conjunction with a clean cloth/paper towels or antiseptic towelettes. If these alternatives are used then the hands are to be washed with soap and running water as soon as feasible. Employers who must provide alternatives to readily accessible handwashing facilities should list the location, tasks, and responsibilities to ensure maintenance and accessibility of these alternatives.]

After removal of personal protective gloves, employees shall wash hands and any other potentially-contaminated skin area immediately or as soon as feasible with soap and water.

If employees incur exposure to their skin or mucous membranes, those areas shall be washed or flushed with water as appropriate as soon as feasible following contact.

Needles

Contaminated needles and other contaminated sharps will not be bent, recapped, removed, sheared or purposely broke. OSHA allows an exception to this if the procedure would require that the contaminated needle be recapped or removed and no alternative is feasible and the action is required by the medical procedure. If such action is required, then the recapping or removal of the needle must be done by the use of a mechanical device or a one-handed technique. At this facility recapping or removal is only permitted for the following procedures: [list the procedures and also list the mechanical device to be used or, alternately, if a one-handed technique will be used.]

Containers for Reusable Sharps

Contaminated sharps that are reusable are to be placed immediately, or as soon as possible after use, into appropriate sharps containers. At this facility the sharps containers are puncture resistant, labeled with a biohazard label, and are leak proof. [Employers should list here where sharps containers are located as well as who has responsibility for removing sharps from containers and how often the containers will be checked to remove the sharps.]

Work Area Restrictions

In work areas where there is a reasonable likelihood of exposure to blood or other potentially-infectious materials, employees are not to eat, drink, apply cosmetics or lip balm, smoke, or insert contact lenses. Food and beverages are not to be kept in refrigerators, freezers, shelves, cabinets, or on counter tops or bench tops where blood or other potentially-infectious materials are present.

Mouth pipetting/suctioning of blood or other potentially-infectious materials is prohibited.

All procedures will be conducted in a manner that minimizes splashing, spraying, splattering, and generation of droplets of blood or other potentially-infectious materials. Methods that will be employed at this facility to accomplish this goal are: [list methods, such as covers on centrifuges, usage of dental dams if appropriate, etc.]

Specimens

Specimens of blood or other potentially-infectious materials will be placed in a container that prevents leakage during the collection, handling, processing, storage, and transport of the specimens.

The container used for this purpose will be labeled or color-coded in accordance with the requirements of the OSHA standard. [Employers should note that the standard provides for an exemption for specimens from the labeling/color coding requirement of the standard provided that the facility utilizes Standard-Universal Precautions in the handling of all specimens and the containers are recognizable as containing specimens. This exemption applies only while the specimens remain in the facility. If the employer chooses to use this exemption, then it should be stated here.]

Specimens that could puncture a primary container will be placed within a secondary container which is puncture resistant. [The employer should list here how this will be carried out, e.g. which specimens, if any,

could puncture a primary container, which containers can be used as secondary containers, and where the secondary containers are located at the facility.]

If outside contamination of the primary container occurs, the primary container shall be placed within a secondary container, which prevents leakage during the handling, processing, storage, transport, or shipping of the specimen.

Contaminated Equipment

Equipment which has become contaminated with blood or other potentially-infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary, unless the decontamination of the equipment is not feasible. [Employers should list here any equipment which it is felt can not be decontaminated prior to servicing or shipping.]

Personal Protective Equipment

All personal protective equipment used at this facility will be provided without cost to employees. Personal protective equipment will be chosen based on the anticipated exposure to blood or other potentially-infectious materials. The protective equipment will be considered appropriate only if it does not permit blood or other potentially-infectious materials to pass through or reach the employees' clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used**.**

Protective clothing will be provided to employees in the following manner: [List how the clothing will be provided to employees including who has responsibility for its distribution, which procedures require the protective clothing, and the type of protection required. This could also be listed as an appendix to this program.]

The employer could use a checklist as follows:

Personal Protective Equipment Task

Gloves
Lab Coat
Face Shield
Clinic Jacket
Protective eyewear (with solid side shields)
Surgical Gown
Shoe Covers/Head Covers
Utility Gloves
Examination Gloves
Other PPE (List)

All personal protective equipment will be cleaned, laundered, and disposed of by the employer at no cost to employees. All repairs and replacements will be made by the employer at no cost to employees.

All garments that are penetrated by blood shall be removed immediately or as soon as feasible. All personal protective equipment will be removed prior to leaving the work area. The following protocol has been developed to facilitate leaving the equipment at the work area: [List where employees are expected to place the personal protective equipment upon leaving the work area, and other protocols, etc.]

Gloves shall be worn where it is reasonably anticipated that employees will have hand contact with blood, other potentially-infectious materials, non-intact skin, and mucous membranes. Gloves will be available from [state location and/or person who will be responsible for distribution of gloves].

Gloves will be used for the following procedures: [List procedures here]

Disposable gloves used at this facility are not to be washed or decontaminated for reuse and are to be replaced as soon as practical when they become contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised. Utility gloves may be decontaminated for reuse provided that the integrity of the glove is not compromised. Utility gloves will be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration or when their

ability to function as a barrier is compromised.

Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin length face shields, are required to be worn whenever splashes, spray, splatter, or droplets of blood or other potentially-infectious materials may be generated and eye, nose, or mouth contamination can reasonably be anticipated. Situations at this facility, which would require such protection, are as follows: [list specific situations]

The OSHA standard also requires appropriate protective clothing to be used, such as lab coats, gowns, aprons, clinic jackets, or similar outer garments. The following situations require that such protective clothing be utilized: [list specific situations]

This facility will be cleaned and decontaminated according to the following schedule: [list area and schedule]

Decontamination will be accomplished by utilizing the following materials:
[list the materials which will be utilized, such as bleach solutions or EPA registered germicides]

All contaminated work surfaces will be decontaminated after completion of procedures and immediately or as soon as feasible after any spill of blood or other potentially-infectious materials, as well as the end of the work shift if the surface may have become contaminated since the last cleaning. [Employers should add in any information concerning the usage of protective coverings, such as plastic wrap which they may be using to assist in keeping surfaces free of contamination]

All bins, pails, cans, and similar receptacles shall be inspected and decontaminated on a regularly scheduled basis [list frequency and by whom]

Any broken glassware which may be contaminated will not be picked up directly with the hands. The following procedures will be used: [describe procedures]

Regulated Waste Disposal

All contaminated sharps shall be discarded as soon as feasible in sharps containers that are located in the facility. Sharps containers are located in: [specify locations of sharps containers]

Regulated waste other than sharps shall be placed in appropriate containers. Such containers are located in: [specify locations of containers]

Laundry Procedures

Laundry contaminated with blood or other potentially-infectious materials will be handled as little as possible. Such laundry will be placed in appropriately marked bags at the location where it was used. Such laundry will not be sorted or rinsed in the area of use.

All employees who handle contaminated laundry will utilize personal protective equipment to prevent contact with blood or other potentially infectious materials.

Laundry at this facility will be cleaned at [Employers should note here if the laundry is being sent off-site. If the laundry is being sent off-site, then the laundry service accepting the laundry is to be notified, in accordance with section (d) of the standard.]

Hepatitis B Vaccine

All employees who have been identified as having exposure to blood or other potentially-infectious materials will be offered the Hepatitis B vaccine at no cost to the employee. The vaccine will be offered within 10 working days of their initial assignment to work involving the potential for occupational exposure to blood or other potentially-infectious materials unless the employee has previously had the vaccine or who wishes to submit to antibody testing which shows the employee to have sufficient immunity.

Employees who decline the Hepatitis B vaccine will sign a waiver, which uses the wording in Appendix A of the OSHA standard.

Employees who initially decline the vaccine but who later wish to have it may then have the vaccine provided at no cost. [Employers should list here who has responsibility for assuring that the vaccine is offered, the waivers are signed, etc. Also, the employer should list who will administer the vaccine.]

Post-Exposure Evaluation and Follow-up

When the employee incurs an exposure incident, it should be reported to: [list who has responsibility to maintain records of exposure incidents]

All employees who incur an exposure incident will be offered post-exposure evaluation and follow-up in accordance with the OSHA standard.

This follow-up will include the following:

-Documentation of the route of exposure and the circumstances related to the incident.

-If possible, the identification of the source individual and, if possible, the status of the source individual. The blood of the source individual will be tested (after consent is obtained) for HIV/HBV infectivity.

-Results of testing of the source individual will be made available to the exposed employee with the exposed employee informed about the applicable laws and regulations concerning disclosure of the identity and infectivity of the source individual. [Employers may need to modify this provision in accordance with applicable local laws on this subject. Modifications should be listed here.]

-The employee will be offered the option of having their blood collected for testing of the employee's HIV/HBV serological status. The blood sample will be preserved for up to 90 days to allow the employee to decide if the blood should be tested for HIV serological status. However, if the employee decides prior to that time that testing will or will not be conducted, then appropriate action can be taken and the blood sample discarded.

-The employee will be offered post-exposure prophylaxis in accordance with the current recommendations of the U.S. Public Health Service. These recommendations are currently as follows: [list here or include as an appendix to the plan.]

-The employee will be given appropriate counseling concerning precautions to take during the period after the exposure incident. The employee will also be given information on what potential illnesses to be alert for and to report any related experiences to appropriate personnel.

-The following person(s) has been designated to assure that the policy outlined here is effectively carried out as well as to maintain records related to this policy: [list individual here]

Interaction with Health Care Professionals

A written opinion shall be obtained from the health care professional who evaluates employees of this facility. Written opinions will be obtained in the following instances:

1. When the employee is sent to obtain the Hepatitis B vaccine.

2. Whenever the employee is sent to a health care professional following an exposure incident.

Health care professionals shall be instructed to limit their opinions to:

1. Whether the Hepatitis B vaccine is indicated and if the employee has received the vaccine or for evaluation following an incident.

2. That the employee has been informed of the results of the evaluation and offered follow-up treatment.

3. That the employee has been told about any medical conditions resulting from exposure to blood or other potentially-infectious materials. [Note that the written opinion to the employer is not to reference any personal medical information.]

Training for all employees will be conducted prior to initial assignment to tasks where occupational exposure

may occur. Training will be conducted in the following manner: [list method(s) of training]
Training for employees will include the following and explanation of:

1. The OSHA Standard for Bloodborne Pathogens.
2. Epidemiology and symptomatology of bloodborne diseases.
3. Modes of transmission of bloodborne pathogens.
4. This Exposure Control Plan, (i.e., points of the plan, lines of responsibility, how the plan will be implemented, etc.).
5. Procedures which might cause exposure to blood or other potentially-infectious materials at this facility.
6. Control methods, which will be used at the facility to control exposure to blood or other potentially-infectious materials.
7. Personal protective equipment available at this facility and who should be contacted concerning it.
8. Post-exposure evaluation and follow-up.
9. Signs and labels used at the facility.
10. Hepatitis B vaccine program at the facility.

Record Keeping

All records required by the OSHA standard will be maintained by: [Insert name or department responsible for maintaining records.]

All provisions required by the standard will be implemented by: [Insert date for implementation of the provisions of the standard.]

All employees will receive annual refresher training. [Note that this training is to be conducted within one year of the employee's previous training.]

The outline for the training material is located: [List where the training materials are located.]

ATTACHMENT 2

ULTRASONIC CLEANER TEST PROCEDURE

1. Prepare an aluminum foil sample. Obtain a roll of standard lightweight household aluminum foil. Unroll a piece of foil measuring approximately one (1) inch greater than the depth of the tank by approximately the width (long dimension) of the tank. For example: A tank with dimensions of 9 inches long by 5 inches wide by 4 inches deep would require a foil sample measuring 9 inches by 5 inches. Use scissors to cut the foil - Do not tear.

2. Prepare a fresh solution of ultrasonic cleaning solution according to the manufacturer's instructions and fill the ultrasonic tank to one inch of the brim.

3. If heaters are supplied with the cleaner, turn them off for the remainder of the test. Also, if the unit is supplied with a HI/LO switch, it should be set in the HI position.

4. Before placing the foil in the tank, turn the ultrasonic cleaner on for five (5) minutes using the timer located on the cleaner. Be sure to turn the timer to 20 minutes, then back to the 5 minutes setting for maximum time accuracy.

5. Place foil sample which was prepared in step 1 into the tank in a vertical position. The foil long dimension should be positioned with the long tank dimension. The foil should extend downward, but should not touch the tank bottom.

6. Hold the foil, approximately centered front to back, as steady as possible. Turn the ultrasonic cleaner on for exactly 20 seconds.

7. Turn the cleaner off and remove the foil sample. Shake the foil sample dry of any water droplets. Allow foil to air dry, being careful not to wrinkle the foil.

8. Properly functioning units will result in foil surfaces that are uniformly "peppered" (covered with a tiny pebbling effect), over the entire surface. If areas greater than ½ inch square show no pebbling, there may be a problem with the unit. Re-test with new foil to substantiate the failure. The unit, along with its latest foil record, should be returned to your service center for service, if both samples fail. Foil samples may be retained for future comparison. If future tests show marked changes over time you may need to service your unit. Foil samples may be sent with units returned to the manufacturer for service.

ATTACHMENT 3

COMPARISION OF HEAT STERILIZATION METHODS

METHODS	STANDARD STERILIZING CONDITIONS	ADVANTAGES	PRECAUTIONS	SPORE-TESTING*
Steam Autoclave	20 min at 121ºC (15 psi)	Time efficient, Good penetration, Can sterilize water-based liquids	Do not used closed containers, May damage plastic and rubber items, Nonstainless steel metal items corrode, Use of hard water may leave deposits	*Bacillus stearothermophilus* strips, vials, or ampules
Unsaturated Chemical Vapor	20 min at 131ºC (20 – 40 psi)	Time efficient, No corrosion, Items dry quickly after cycle	Do not use closed containers, May damage plastic and rubber items, Must use special solution, Predry instruments or dip in special solution, Provide adequate ventilation, Cannot sterilize liquids	*Bacillus stearothermophilus* strips
Dry Heat Oven	60 – 120 min at 160ºC	No corrosion, Can use closed containers, Large capacity per cost, Items are dry after cycle	Longer sterilization time, Cannot sterilize liquids, May damage plastic and rubber items, Do not open door before end of cycle	*Bacillus subtilis* strips
Rapid Heat Transfer	12 min at 190ºC (for wrapped items) 6 min at 190ºC (for unwrapped items)	No corrosion, Short cycle, Items are dry after cycle	Predry instruments, Cannot sterilize liquids, May damage plastic and rubber items, Do not open door before end of cycle, Small capacity per cost, Predry instruments, Unwrapped items are quickly contaminated after cycle	*Bacillus subtilis* strips

* Contact sterilizer manufacturer or USAF Dental Investigation Service for recommended products.

ATTACHMENT 4

DENTAL WATERLINE TREATMENT PROTOCOL

(10 STEPS TO CLEANER DENTAL UNIT WATER)

ONCE EACH WEEK

1. Prepare fresh 1:10 bleach solution (1 part household bleach to 9 parts water)
2. Remove water reservoir and discard residual water
3. Replace water reservoir and air purge all waterlines
4. Fill water reservoir to the top with bleach solution
5. Run bleach through all lines capable of carrying water
6. Allow bleach solution to stand for ten minutes
7. Remove water reservoir and discard bleach (OK to top off and use on other units -- discard in sink and rinse with copious amounts of water when done)
8. Replace water reservoir and air purge to remove residual bleach
9. Flush all lines with 750 mL of clean* water, sterile** water, or tap water with 1 drop of bleach
10. Air purge and leave lines dry until next clinical use -- refill only with clean* water, sterile** water, or tap water with 1 drop of bleach. Avoid touching the water tube with ungloved hands which may contaminate the system with skin or enteric bacteria

* freshly boiled water or water prepared by heat distillation; store in containers that have been disinfected at least once per week
** sterile bottled water or water prepared by autoclaving